THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 38 MARCH, 1936 No. 6

INDEX TO CONTENTS

Ammonia in the Vulcanization of Rubber 323
By Dr. J. F. T. Berliner and L. H. Brandt

Rayon Treatment for Tires 326

Malacca Resistant Primers 326

Factors Affecting Flex Cracking in Tire Treads 327
By H. Walter Grote

Stanley Stretchable Lacquer 328

Making Rubber Matrices and Stereos 328

Making Masks of Latex 329

Apparatus for Permanent Set Measurement 331

Rubber Division Meeting in Kansas City 333

New Equipment Section 335

REGULAR DEPARTMENTS

Late Domestic News	339	**Editorials**	338
Financial News	344	**Chemical Markets**	351
Book Reviews	337	**Statistics**	352
New Goods Section	349	**Market Place**	356
Names in the News	346	**Advertising Index**	360
Rubber, Cotton Markets ...	350	**Classified Ads**	360

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THE RUBBER AGE

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Ammonia in the Vulcanization of Rubber

By Dr. J. F. T. Berliner and L. H. Brandt

National Ammonia Div., E. I. du Pont de Nemours & Co., New York

RECENT years have witnessed a rapid development of interest and research in rubber processes. Improvements in the methods of vulcanization of rubber have received special consideration as exhibited in the many changes and adaptations now taking place in the industry. One of the important recent developments is the incorporation with the rubber article of one or more of the ingredients of vulcanization by diffusion[1] prior to or during the vulcanization process. The use of ammonia[2] so applied in the vulcanization of rubber goods has been found economically feasible but recently.

The use of ammonia in the vulcanizing process has been found particularly desirable for footwear, which is vulcanized in heaters containing air, either at atmospheric or at elevated pressures. The practice consists in vulcanization in the present well known manner with the exception that ammonia is introduced into the heater with the air. There appears to be a possible field of application of ammonia-air mixtures in the production of molded inner tubes for tires which may result in significant improvements in the quality of the finished product, in addition to the introduction of economies in operation. The successful solution of the problem of molding tires without the use of an air or water bag, on which so much effort has been and is being expended, will present an even larger opportunity for the improvement of the vulcanization through the use of ammonia.

The advantages and benefits to be gained, through

(1) The diffusion process is covered by U. S. Patent 1,777,960 (Sidney M. Cadwell, assignor to Naugatuck Chemical Division, U. S. Rubber Products, Inc.). In this vulcanizing process, a powerful combination of vulcanizing ingredients is so introduced or incorporated in the rubber that not more than a part of the entire combination is present in any one portion of rubber until the preliminary mixing and/or other operations have been substantially or entirely completed, then, when desired, completing the entire vulcanizing combination in the rubber, and vulcanizing. It further comprises incorporating in a body of rubber a part of a powerful combination of vulcanizing ingredients, introducing the balance of the ingredients by diffusion or migration, and vulcanizing. It also includes impregnating a solid mass containing rubber with a non-gaseous halogen-free vulcanizing ingredient substantially without changing the form of the mass, and vulcanizing the rubber. It further comprises introducing parts of a powerful vulcanizing combination into different masses of rubber, sheeting out the masses of rubber, alternately plying the sheets, permitting the complete powerful vulcanizing combination to be formed throughout the plied up material by intermigration of ingredients between the plies, and vulcanizing.

(2) The use of gaseous ammonia in vulcanizing is covered by U. S. Patent 1,871,038 (Sidney M. Cadwell, assignor to Naugatuck Chemical Division, U. S. Rubber Products, Inc.). The invention broadly comprises the vulcanization in an atmosphere containing gaseous ammonia of a rubber stock containing a vulcanizing agent and an organic accelerator, said accelerator being employed in an amount substantially below that normally required for dry heat curing.

the replacement of a portion of the air in the vulcanizer with ammonia, are being rapidly established in the industry. It has been found that goods vulcanized in an atmosphere of ammonia have increased tensile strength, increased resistance to abrasion and softening by oil, improved resistance to aging, improved surface and improved wearing qualities.

Further advantage lies in the fact that oxidation of the rubber is very materially reduced with a resulting increase in the strength of the finished product. Conversely, products of the same strength as before can be produced with less rubber present, and the material saving from this source may be as much as five or ten per cent.

The employment of ammonia in vulcanization produces a hard dry finish on the rubber. The rubber has a characteristic tough resiliency which produces a very pleasing effect without noticeable loss in pliability and elasticity. It has been found that the use of the ammonia apparently does not interfere with the glossy finish produced through the use of linseed oil varnishes.

Ammonia itself acts as an accelerator in the vulcanization of rubber. If the fabricated rubber article already contains an accelerator, the effect of the ammonia is more than additive. It may be considered to activate or intensify the action of an incorporated accelerator[2]. Due to the rapidity with which ammonia penetrates rubber, this activating is effective throughout the article. The well known advantages of accelerated vulcanization are intensified and a superior product results. On the other hand, the often experienced manufacturing difficulties of employing large amounts of powerful accelerators are avoided, and accelerators which previously could not be used on a large manufacturing scale, because of dangers of mill scorching and stock storage difficulties, can now be employed, using smaller quantities with the assistance of ammonia during vulcanization.

This also results in a material reduction in the amount of accelerator required (in some cases less than half the amount used without the ammonia) and where desirable a reduced amount of sulfur may be employed. With these economies should be considered those incident to the elimination of pre-vulcanization on the mixing rolls, the semi-curing in stock storage and to the greater flexibility in the choice of accelerators and in the control of temperatures of the rolls. Accelerators which can be used in the stock for vulcanizing in an atmosphere of ammonia vary quite widely, although not every accelerator shows the advantages cited to an equal degree.

The conditions of vulcanization need not be altered. The temperature, pressure and time required can be maintained essentially the same as in present practice.

Ammonia Handling and Control

Anhydrous ammonia is supplied in cylinders of 25, 50, 100 and 150 pounds capacity as well as in tank cars holding 25 tons. The cylinders are equipped with siphon valves so arranged that liquid or gaseous ammonia may be withdrawn as desired. When the cylinder is placed so that the brass tag with the serial number of the cylinder is uppermost, the dipper pipe is submerged and liquid ammonia is withdrawn. Instructions for connection handling and return are supplied with each cylinder.

In withdrawing gaseous ammonia from a cylinder at a rate in excess of about 1.5 pounds (approximately 34 cubic feet) per hour a refrigeration effect is produced due to the evaporation of liquid anhydrous ammonia into the gaseous state. This causes a drop in pressure in the cylinder with a resultant diminution in the rate of gas flow from the cylinder. In applying ammonia to vulcanization autoclaves, it is usually desired to introduce amounts of the order of several pounds of ammonia (the amount depending on the size of the unit) within a very short period of time. In order to accomplish this without resorting to a battery of cylinders it is necessary to withdraw the ammonia from the cylinder as a liquid and vaporize it in a separate apparatus.

Ready System of Application

The simplest and most effective type of vaporizer to install is a steam jacketed, welded, seamless steel pipe of two inches and upwards in internal diameter and of suitable length to supply the proper transfer of heat to the ammonia. Either waste or live steam may be employed. The vaporizer and lines should be designed to withstand a pressure of 180 lbs./sq. in., with a suitable factor of safety (at least 3).

A ready system of application is to set one or more ammonia cylinders on a platform scale and connect these by means of flexible ammonia coupling to a manifold which is connected to a vaporizer such as described above. A valve (or valves) is placed at the *effluent end* of the vaporizer and the entire rate of discharge of ammonia controlled from this (or these) valve. There should be no closed valves between the vaporizer and the ammonia cylinders.

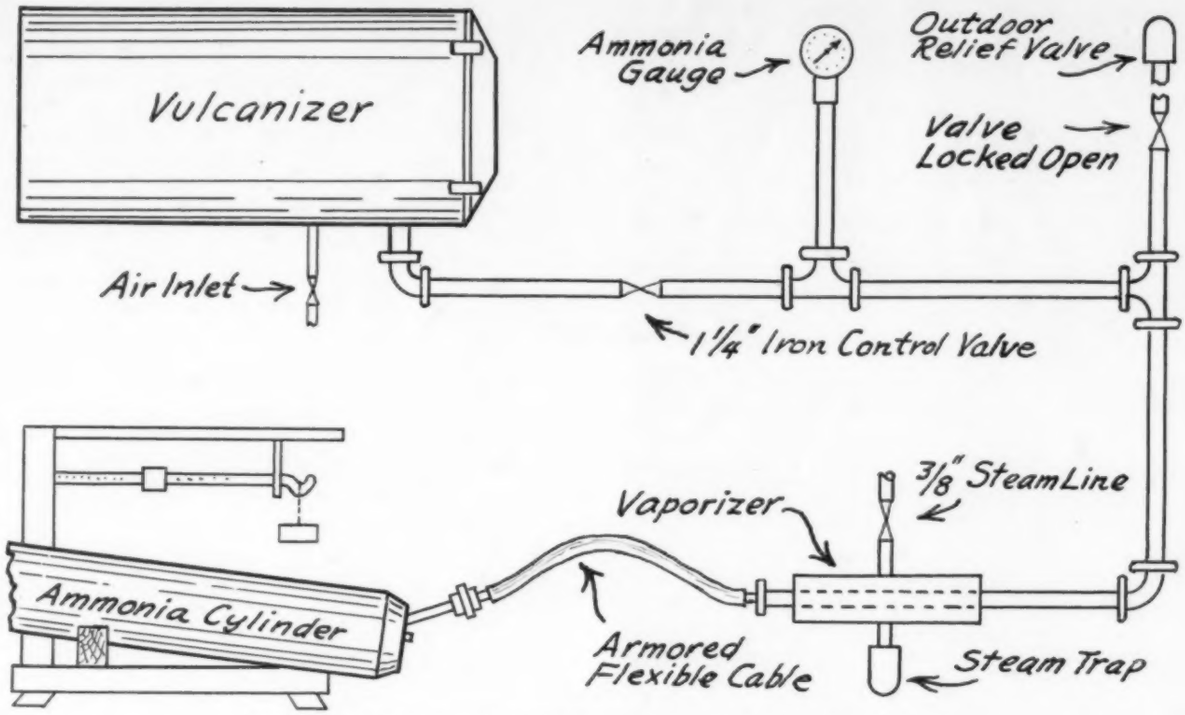
This manner of connection and discharge insures that the pressure throughout the entire system will never exceed the pressure within the cylinder. This pressure is dependent only on the temperature of the cylinder (atmospheric). When the valve on the *effluent* of the vaporizer is closed, any liquid ammonia still remaining in the vaporizer will be forced back into the cylinder. To insure safety and proper control an ammonia pressure gauge and a safety valve with an outside vent should be placed in the line between the control valve and the vaporizer.

The desired ammonia is introduced into the vulcanizer in the following manner: the platform scale is first balanced and the scale then off-set to about the weight of ammonia desired to be introduced into the autoclave. The valve on the exit end of the vaporizer is opened and left open until the balance arm on the scale drops to the position of balance whereupon the valve is shut.

This affords a simple, safe, inexpensive, easily operateable and accurate means of introducing the desired amount of ammonia into the vulcanization chamber.

Ammonia is a gas at ordinary temperatures. It forms a liquid on cooling which boils at —33.4° C. (—29.1° F.) and freezes at —77.7° C. (—107.9° F.). Its critical pressure is 111.5 atmospheres and critical temperature 132.4° C. (270.3° F.).

The density of liquid ammonia at its boiling point is 42.6 pounds per cubic foot (0.683). The density of the solid at —112° F. is 51.0 pounds per cubic foot (0.817). The density of liquid ammonia in the cylinders at 70° F. is 38.1 pounds per cubic foot (0.609).



METHOD OF INTRODUCING AMMONIA INTO VULCANIZING RETORT

VAPOR PRESSURE OF AMMONIA AND VOLUME OF VAPOR*

Temperature	Pressure		Volume of Vapor	
F.	Absolute lbs./sq. in.	Gage lbs./sq. in.	Saturated cub. ft./lb.	Reduced to Atm. Press. cub. ft./lb.
— 30	13.9	—	18.97	—
— 20	18.3	3.6	14.68	18.4
0	30.4	15.7	9.12	19.3
20	48.2	33.5	5.91	20.2
40	73.3	58.6	3.97	21.2
60	107.6	92.9	2.75	22.0
65	117.8	103.1	2.52	22.3
70	128.8	114.1	2.31	22.5
75	140.5	125.8	2.12	22.7
80	153.0	138.3	1.96	22.9
85	166.4	151.7	1.80	23.1
90	180.6	165.9	1.66	23.4
95	195.8	181.1	1.53	23.6
100	211.9	197.2	1.42	23.8
105	228.9	214.2	1.31	24.1
115	266.2	251.5	1.13	24.4
125	307.8	293.1	0.97	24.8

SUPERHEATED AMMONIA—VOLUME IN CUBIC FT./LB.*

Temp.	Absolute Pressure Lbs. / Sq. Inch								
F.	10	15	20	25	30	35	40	45	50
30	30.6	20.3	15.1	12.0	10.0	8.5	7.4	6.5	5.8
40	31.2	20.7	15.4	12.3	10.2	8.7	7.6	6.7	6.0
50	31.8	21.1	15.9	12.6	10.4	8.9	7.7	6.8	6.1
60	32.5	21.6	16.1	12.8	10.6	9.1	7.9	7.0	6.3
70	33.1	22.0	16.4	13.1	10.9	9.3	8.1	7.2	6.4
80	33.8	22.4	16.9	13.4	11.1	9.5	8.3	7.3	6.6
90	34.4	22.9	17.1	13.6	11.3	9.7	8.4	7.5	6.7
100	35.1	23.3	17.4	13.9	11.6	9.9	8.6	7.6	6.8
120	36.4	24.2	18.1	14.4	12.0	10.2	8.9	7.9	7.1
140	37.6	25.0	18.7	15.0	12.4	10.6	9.3	8.2	7.4
160	38.9	25.9	19.4	15.5	12.9	11.0	9.6	8.5	7.7
180	40.2	26.7	20.0	16.0	13.3	11.4	9.9	8.8	7.9
200	41.4	27.6	20.7	16.5	13.7	11.8	10.3	9.1	8.2
220		28.4	21.3	17.0	14.2	12.1	10.6	9.4	8.4
240			21.9	17.5	14.6	12.5	10.9	9.7	8.7
260				18.0	15.0	12.9	11.2	10.0	9.0
280					15.4	13.2	11.6	10.3	9.2
300							11.9	10.6	9.5

LATENT HEAT OF VAPORIZATION AND HEAT CONTENT OF AMMONIA*

Temp. F	Pressure Gage Lbs./Sq. In.	Latent Heat of Vaporization B.T.U./Lb.	Heat Content Liquid	Vapor
— 40	—8.7	597.6	0	597.6
— 30	—1.6	590.7	10.7	601.4
— 20	3.6	585.6	21.4	605.0
—	15.7	568.9	42.9	611.8
20	33.5	553.1	64.7	617.8
40	58.6	536.2	86.8	623.0
60	92.9	518.1	109.2	627.3
70	114.1	508.6	120.5	629.1
80	138.3	498.7	132.9	630.7
90	165.9	488.5	143.5	632.0
100	197.2	477.8	155.2	633.0
110	232.3	466.7	167.0	633.7
125	293.1	448.9	185.1	634.0
Critical 270.3	2624.4	0	445.0	445.0

* Values taken are derived from U. S. Bureau of Standards Circular No. 142, "Tables of Thermodynamic Properties of Ammonia," 1923.

Ammonia-air mixtures may be dealt with in perfect safety from explosion and fire hazard if certain simple and fundamental factors are given consideration. Mixtures of ammonia and air of certain limited compositions are inflammable. The exact limits of the composition of the inflammable mixtures depend almost entirely on the temperature conditions. Under ordinary temperature conditions ammonia-air mixtures containing from 16% to 27% of ammonia by volume may be ignited by a free flame. At 100° F. the limits are 15.4% to 27%; at 200° F. from 15.1% to 28.2%; and at 300° F. from 14.6% to 29.2%. Pressure has very little effect on the limits of the composition of these inflammable mixtures, but does influence the rate of flame propagation.

The rate of burning of ammonia in air is very slow as compared to the usual fuel gases. The maximum rate of flame propagation for ammonia-air is

about 1.7 ft. per second as compared with 850 ft. per second for water gas. This maximum occurs in an ammonia-air mixture containing about 21% by volume of ammonia.

In the application of ammonia to rubber vulcanization care should be taken not to employ a mixture of air and ammonia containing between 14% and 28% by volume ammonia. It should be emphasized that mixtures approaching 21% of ammonia may be hazardous when exposed to a free flame. (Coward & Jones, "Limits of Inflammability of Gases and Vapors," U. S. Bureau of Mines Bulletin 279, p. 21; Schliephake, Nagel and Schemel, *Zeit. angew. Chem.*, Vol. 43, p. 302, 1930).

Historical References

The literature reveals that as far back as 1881 the use of ammonia in vulcanizing was known as recorded in Bedford & Winkleman's, "Systematic Survey of Rubber Chemistry" from which the following abstracts and references are taken. It was not until recent years however that ammonia was put to practical and commercial use in vulcanization as indicated by the Cadwell patents mentioned in the above article.—EDITOR.

1. BOURN, A. O.—Vulcanization of rubber in an atmosphere of NH_3 gives increased tensile strength. "Process of Vulcanizing Rubber"—U. S. Patent 697,792 (1902); *J.S.C.I.* **21**, 626 (1902); *I.R.J.* **22**, 230 (1901).

2. GEOFFREY, & DELORE, G.—Vulcanizing with the aid of NH_3 gas under pressure. French Patent 329,519 (1903); *J.S.C.I.* **22**, 1056 (1903); *Caout.* 1, 68 (1904); See p. 106, *"Coutchouc and Gutta Percha,"* by E. Tassilly. Octave Dion et Son, Paris, 1911.

3. MOURELEY—Vulcanizing rubber with 2-3% sulfur in 12% ammonia solution of vapor (1884). See p. 175, *"India Rubber and Gutta Percha,"* by Seeligmann, T., Torrilhon, G. L. & Fanconnet, H.—Scott, Greenwood & Son, London (1910); also p. 147, 1903 edition of same book. See also p. 101, Tassilly book mentioned above.

4. ROWLEY, T.—Rubber articles containing sulfur vulcanized by ammonia gas with heat and pressure or by aqueous solutions. "Vulcanization in an atmosphere of Ammonia"—English Patent 787 (1881); *I.R.J.* **14**, 403 (1897).

5. TILCHE, E.—Vulcanization of rubber in an atmosphere of ammonia or other volatile alkali. H_2S or CO_2 may be added. "Vulcanizing with Ammonia Gas"—English Patent 148,349 and 148,350 (1920); void. *C.A.* **15**, 542 (1921); *Chem. Met. Eng.* **23**, 1229 (1920); *I.R.J.* **61**, 170 (1921); French Patent 510,197 (1919); *Caout.* **18**, 10894, (1921); *I.R.W.* **64**, 820 (1921).

Rayon Treatment for Tires

CONTINUED experiments on the possibility of utilizing rayon as a tire fabric material conducted by Goodyear at Akron has resulted in the application and granting of a British patent (433,777) to the Wingfoot Corporation, of Wilmington, Delaware, a Goodyear subsidiary, covering the processing of rayon to enable its use for such mechanical purposes as tires, hose, fan belting, mats, etc. In the process, rubber is bonded to artificial silk by treating the silk with an aqueous protein-latex composition, drying, applying a rubber composition, and vulcanizing.

The artificial silk (or rayon) may be in the form of a sliver, roving, thread, strand, yarn or cord, or other forms, and may be made fom viscose, cellulose nitrate or acetate, or cuprammonium cellulose. (Known experiments have been conducted with cuprammonium cellulose for the most part—Editor). The protein is preferably casein, but glue, albumin, gelatin or other proteins may be used. A casein-latex composition may be made by grinding casein in water, adding dilute alkali (aqueous ammonia), regrinding and mixing with latex. Lime, sodium fluoride, sodium carbonate, etc., may be substituted for the ammonia. Age resisters for casein, such as hydroquinone, and insolubilizing agents may also be added.

According to the process, the artificial silk is first dried at room temperature to avoid blistering after treatment with the protein-latex composition after which further drying may be done at higher temperatures. The finished material, in addition to its other suggested uses, may be used in the manufacture of fan belts of the V or flat section types.

Malacca Resistant Primers

A COMPLETE line of primers for bonding various materials, including steel, aluminum, wood, fabric, rubber, etc., is being merchandised by Manson Glover, of Stoughton, Mass., successor to the Colvulc Rubber Company, under the trade name of Malacca. These primers combine rubber with synthetic resins, the rubber content, which is high, assuring flexibility and abrasive dust protection, the synthetic resins protecting the covered surface against rust and corrosion. Tests have indicated that the primers, in addition to their other functions, make effective undercoatings for paints and enamels that do not include oil in their composition.

For rubber and fabric, the company recommends the Malacca F Primer, which has a rubber cement base and is compounded with an adhesive gum. It is black in color, very viscous and has a strength on rubber of 7½ lbs. with 16 lbs. strength on fabric. Malacca Primer 101 is suggested for metal and wood, the latter material generally requiring two coats. This primer inhibits dust, has an isomerized rubber base, a clear amber film, and contains no pigments. Its strength on sandblasted metal is 18 lbs. For bonding various rubbers to metal or wood that is not sandblasted, Malacca Primer 125 is recommended, this primer having a rubber cement base, compounded with adhesive gum and pigments, creamy white in color. A special primer, 103, is available for concrete jobs, having an isomerized rubber base, and compounded with a special filler to prevent penetration of water through the concrete from the outside.

Another primer produced by the company, Malacca Primer M, which is termed standard for latex over wood and satisfactory for latex over sandblasted metal, has recently been the subject of an extensive test covering a nine-month period. Seeking the best practical protection for a chamber in a large production unit which was continually washed out with water spray, one manufacturer installed a Bureau of Standards type salt spray stand and a humidity chamber, testing more than 100 materials from April, 1935, to January, 1936.

Aluminum plates coated on one side with two brush coats of Malacca Primer M were tested, according to Manson Glover. The aluminum failed in both test chambers, corroding 100% in 312 hours in the salt spray and 70% in 2900 hours in the humidity chamber. The primer is understood to have stood up satisfactorily to the end of the test in the salt spray, and showed only two medium blisters at the end of 2928 hours. It is said to have been wholly unaffected by the humidity chamber.

The same primer was tested against control plates under coatings of a well-known anti-corrosive enamel. In salt spray, the control enamel failed in less than 1500 hours, whether air-dried or baked. The same enamel, air-dried over the primer, was removed after 3100 hours, showing an edge rust of 15% and a surface rust of 1% in the salt spray. No rust appeared in the same time period in the humidity chamber. Baked at 250° over the primer, the enamel showed a 10% edge rust and no surface rust in salt spray, and no effects from the humidity test.

Malacca Primer M consists of rubber and a combination of gums and pigments dispersed in coal-tar solvents. Its standard application calls for brushing, but a sprayable material is also available. In addition to primers, Manson Glover produces a varied line of plastic and liquid rubbers for many purposes.

Factors Affecting Flex Cracking in Tire Treads

Construction Details of Tire Are As Important As Proper Compounding in Overcoming Flex Cracking

By H. Walter Grote

United Carbon Company, Charleston, W. Va.

IT was almost a decade ago when the bogey of tread cracking began to sow its crop of silver threads upon the heads of bewildered tire compounders. In those days of leisurely traveling speeds, larger rim diameters, and fewer stop lights, the conventional carbon black content of a good tread compound ranged around 42 per cent on the rubber. Changing conditions demanded ever increasing tire performance and our chemical fraternity was quick to take advantage of the improved abrasion resistance obtainable by increasing the amount of carbon black in tire tread formulation.

Suddenly tire manufacturers became "flex crack conscious." The phenomenon was not fully understood at first and, in spite of the excellent development work and manifest improvements rendered, the chemists were at first blamed for this new scourge, including conditions beyond their control, that beset the industry and further increases in the carbon black ratio were temporarily frowned upon. Laboratory evaluation methods of flex cracking resistance were devised, antioxidants and antiflex agents were born and the chemists began to learn a great deal about the fundamental causes of flex cracking.

Tire construction engineers began to revise cord constructions and cord angles were studied with a view towards preventing carcass growth under inflation in service. Surface tension and excessive cross-sectional distortion were corrected as a result of experiments with the shape of tires as molded and brought about certain reforms. Likewise tread contours and tread designs were radically changed. Filleting of grooves, substitution of U-shaped channels for V-shaped channels, the supporting of running bars and the addition of a sub-tread, the treatment of green tires and mold surfaces and other similar factors began to be adopted as essential measures to inhibit incipient tread cracking.

An excellent paper on the effect of various factors in flex cracking by Gray, Karch and Hull[1] describes a method developed in the Goodrich laboratories for comparing the flex cracking properties of tread stocks on standard tires which permits the use of laboratory-mixed batches. In addition to making possible the testing of the effect of carcass construction, tread design, etc., on flex cracking, the method can be used to

[1] "Determining Flex Cracking in Treads," *Analytical Edit., Ind. & Eng. Chem.* **6**, No. 4, July 15, 1934.

The reproduction on the left shows a section of a tire on which flex cracks are plainly visible. A tire from the same mold is seen on the right after fillets have been added at the bottom of the grooves, the result being the elimination of the flex cracks.

test tires of different makes. Among the tests reported were the results of the effect of aging, cure variation, dirt and grit as well as comparisons of growth of cracks in molded and extruded tubes, accelerators, age resisters, carbon blacks, tread designs, etc.

Importance of Constructional Details

The effects of constructional details on flex cracking are discussed by Benson in his paper on "Pneumatic Tires—Design and Construction".[2] In addition to the usual appearance, ruggedness and non-skid properties expected of a tire tread, he states that the ideal tread must also be flexible to prevent cracking between the design members and avoid undue localized strains on the carcass and beads. Therefore, in the development of a tread pattern, it is necessary to establish the proper dimensional relationships between tread width and tread arc and to determine the correct spacing and arrangement of the design members which consist of bars, grooves and blocks. The width of the grooves, circumferential as well as cross-sectional, should be such to permit tread movement, yet prevent cracking due to flexing. Benson also suggests careful study of the angle at which the cords cross the crown of the tire so as to give the desired flexibility, yet prevent flex breaks. Carcass and breaker squeegees, as well as the top cushions, by stepping down the action caused by flexing and shocks, also aid in preventing flex breaks, he adds.

The sub-tread, or that portion of the tread compound below the pattern or design, is a detail whose importance is often overlooked. Nicholas[3] states that if the sub-tread is of insufficient thickness, cracking between the tread pattern is likely to occur while if the thickness is excessive more heat will be generated by the tire in service than is necessary. Another possible source of trouble in a tread, according to Nicholas, is in the width. If the tread is narrow it will wear rapidly and if too wide there is a possibility of the shoulders of the tread creating a localized flexing point at the sidewall of the tire which would cause premature carcass failure.

One leading rubber chemist in a tire factory has stated to the author that changes in the tread design are not alone responsible for the elimination of flex cracking as the cord angle is a very important factor as well as the compound itself. In the estimation of this chemist he would place these three factors in the following order based on their effect on flex cracking: (1) Non-skid tread design; (2) Cord angle; (3) Compound. He further states that no matter how excellent the compound, flex cracking will occur if the tread design or the cord angle is wrong.

Results of Combined Rubber Research

The solution of these constructional and engineering problems relieved conditions to such a marked degree that chemists could once more devote their attention to the necessary improvement of tread wear to cope with the more exacting demands of an accelerated industry. The combined rubber research laboratories of the industry set about to study the effects on cracking of various compounding ingredients. A great deal of work was done on the development of antioxidants and antiflex agents and combinations thereof. Physical properties such as modulus, hardness, and tear resistance were probed as to their influence on flex cracking. Methods of proper carbon black dispersion were evolved, comparative tests were made of blacks from various sources and of different types, the effects of cure variations were studied and correct sulfur and accelerator ratios were determined.

Progressive producers of carbon black materially contributed towards this research program and greatly improved their product by eliminating grit, maintaining a rigid quality control and producing a better carbon black especially designed for the reenforcement of rubber compounds.

In retrospect it is gratifying to say that, as a result of this intensive research, the up-to-date tire manufacturer who is today incorporating 50 or more parts of carbon black per 100 parts of rubber in his tread formula in order to meet the exacting demands of changed conditions and high speed traffic is practically free from the once odious menace of tread cracking provided, of course, that he has also taken advantage of all of the known engineering and constructional details of tire design which affect flex cracking.

[2] The Rubber Age (N. Y.) **38**, No. 29, Oct. 1935.
[3] "Developments in Tire Building," *I.R.I. Trans.* **9**, No. 5, Feb. 1934.

Stanley Stretchable Lacquer

INTENDED for use in rubber footwear and other rubber products, a clear water white lacquer has been developed and introduced by the Stanley Chemical Company, East Berlin, Conn. The new lacquer is sufficiently white in color to be applied over white stock either before or after cure without discoloring the rubber. If the rubber discolors in the cure the clear lacquer will not prevent its discoloration, but the lacquer itself will not discolor. The water whiteness, plus the fact that the lacquer does not discolor, also means that it will not change the color of black or brown rubber.

In addition to these features, the new Stanley lacquer has the ability to stretch like rubber. A film can be stretched on rubber fully 200%, according to the manufacturer, and when released will gradually return to its original length. It is said to have unusual resistance to marking, and on certain stocks where it shows a tendency to mark, the mark disappears within a short time. Other claims include extreme durability, adhesion and flexibility, as well as an excellent feel on rubber.

Making Rubber Matrices and Stereos

THE firm of Oscar Friedheim, Ltd., of London, England, uses an interesting process in the manufacture of rubber stereos of type matter and halftone blocks, even of the finest screen. The matrix is made directly from the type form from a piece of composition rubber cut to size which is then placed in a special press where it is held under light pressure, heat being applied by gas burners to the upper platen of the press. After approximately 10 minutes in the press, both the form and matrix are removed and the matrix itself again placed on the bed of the press which is sufficiently raised to compensate for the difference in height between matrix and type.

A piece of composition rubber, fabric backed, cut to the same size as the matrix, is then placed on top of the matrix lying in the press and pressure applied, the composition material being forced into the matrix under combined heat and pressure. After another 10 minutes matrix and stereo are removed.

Making Masks of Latex

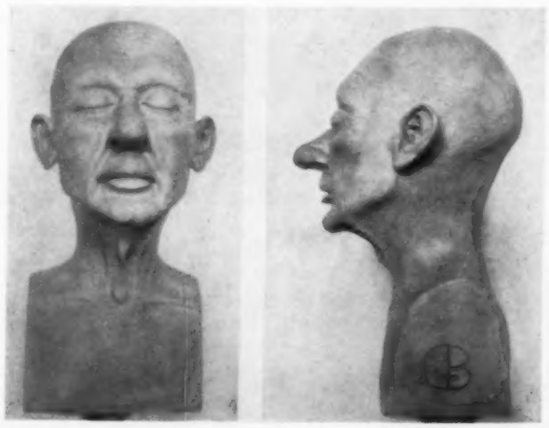
Use of Latex Has Considerably Improved Methods of Making Masks for Theatrical, Marionette and Decorative Purposes

EVER since the days of the ancient Greeks, theatrical producers and ballet masters have been seeking pliable masks for adaptation in their productions and creative dances. Later generations brought a similar demand from the marionette industry, while in the last two decades the motion picture industry opened another market. For the most part, up until recently, suppliers of this type of mask worked with molded rubber and the ultimate results were none too good. The steady progress in latex development, however, has led to better results and also to the ability to accomplish more with the finished product.

One of the outstanding designers of pliant masks made from latex is Garrett Becker, a New York artist who has developed a unique method for producing hundreds of such masks for various purposes. Twelve years ago he started making masks by usual molding methods, but in recent years he began to experiment with latex and now, by using vulcanized latex, he not only has been able to shorten the time necessary to produce a mask but to also make it better and more economically.

The uses to which rubber masks are put fall generally into three classifications: life-size masks for theatrical use and figure displays usually made from 1/32 to 1/16-inch thickness; small-size ornamental masks for decorative purposes in the home, office and theatre, usually made to ¼-inch thickness; and marionette sizes ranging from one-third to one-half life size, thicknesses ordinarily approximating that used for full life size masks.

Life size latex masks in the theatre serve a variety of useful purposes. Where and when time is an important element, use of these masks eliminates the necessity of character make-up and, incidentally, the expense of grease paint, wigs, gadgets, etc. In plays or motion pictures calling for the enactment of scenes indicating the passing of the years, rubber masks again are important time savers in that a series of masks can be molded each portraying age advancement of the one character.



Front and side views of a plaster of Paris mold from which life-size latex masks are cast.

The bottom two pieces are masks as they appear after removal from the mold, the Apache being a completed mask.

Although Mr. Becker is primarily a creator, he not only designs but also carries through all necessary operations to the finished product. He is particularly interested in the creation of latex masks designed for articulation through electro-magnetic means or other forms of control. He explains his process for making life-size masks as follows:

The first step is a moulage cast molded to facial contours, with openings provided for breathing through both the nose and mouth. The moulage is spread over the entire area desired for reproduction and allowed to harden, a matter of a few minutes. A plaster of Paris mold is then made from the moulage cast. Modeling clay is then spread over this negative mold, permitted to harden, and when removed is a positive.

Following this step a piece mold of plaster of Paris is cast, once again in the negative, from the clay mold, after which a wax impression is made from the plaster mold. During these several operations any additional features required may be added to the molds, such as grotesque ears, eyes, nose, hair, scars, etc. The wax mold contains all of these additions, some of them original ideas, some copied from pictorial reproductions, others taken from original masks, drawings, paintings, and the like.

The last step in the mold-making process is a final one-piece mold of plaster of Paris made from the wax impression. Into this mold is poured a specially-prepared vulcanized latex, completely filling the mold.

The latex is permitted to remain for a pre-determined length of time dependent on the thickness required in the finished product, vulcanization being aided by maintaining room temperatures of 70 to 74° F.

The masks are given natural flesh color or grotesque colorings, not by the addition of any pigments to the latex compound, but rather by hand application after the mask is vulcanized. For this purpose dry colors mixed to a paste form were found to be most satisfactory. By this means all manner of decorations may be given to the masks, faithfully following the color design of the mask model used.

Similar steps are followed in the production of small-size masks for decorative or ornamental purposes, and for the marionette types, with the exception that no moulage cast is necessary since still models are used, the first step being the creation of a clay working model.

From the standpoint of possible articulation, no other material can equal the potentialities offered by the use of latex. Masks of this kind used on figures utilized in industrial displays are becoming increasingly popular since they permit movement obtainable by no other material to as great a degree. Displays of this nature were seen at the Chicago World's Fair, in the reproduction of Barnum's Museum featured by the Gimbel Brothers' department store in New York City last Christmas, in the pre-historic animal displays by the Sinclair Oil Company, and others.

In most of these displays latex-impregnated hair cloth played an important role. The skins of the animals on exhibit consisted of this latex-impregnated cloth, controlled animation causing the skins to writhe giving the impression of movement accompanied by roaring sounds associated with the jungle animals. In the figures simulating characters associated with The Mighty Barnum, such as Barnum, himself, Jenny Lind, the India Rubber Man, and others, the latex masks were designed so that electrically-controlled vibrations opened the lips of the speakers in such manner that the words issuing from the mouths (by means of a synchronized phonograph) were clearly discernible by the formation of vowels by the lips.

Mr. Becker visualizes bigger and better articulation in connection with latex masks, particularly when adapted for theatrical use for purposes of interpretative dancing. One of his designs calls for a face

An interesting feature of this mask is the writhing "snakes" which are inflated and deflated by means of a tubing system.

The grotesque features in this mask are made part of the molds during their transition period.

fashioned on the Medusa of fable with "snakes" replacing the hair on top of the head. These "snakes" would be cast of latex from models built along the actual reptilian lines, even to protruding fangs, and would be provided with thin air vents extending up through the body to the head. The "snakes" on the mask would be articulated by compressed air, tubing running from the air vents to some inner portion of the dancer's complete costume and operated by hand pressure in such manner that when some of the "snakes" were inflating others would be deflating, thus maintaining a continuous writhing movement during the entire course of the interpretative dance. Medusa, according to legend, was one of the Gorgons, whose beautiful tresses were transformed into snakes by Athena, whose sanctuary Medusa violated.

Another design calls for a mask with protruding teeth in the style of the legendary Cyclops with but one eye centered in the forehead. According to mythology, Cyclops was one of a race of giants, having only one eye, inhabiting Sicily. Extremely large ears, a shock of bushy hair, and the single eye gives this mask a terrifying appearance.

Still another design represents Brahma, the god of Hindu mythology, four-headed and four-handed. All of the four faces, would be molded from latex, while two of the arms would be made of solid rubber so that they would remain in a stationary, upright position when the complete costume was worn, the remaining two arms being part of the cloth costume which would slide over the dancer's arms and waved as needed in keeping with the dance interpretation. The palms of the solid rubber hands face upward, ornaments, such as a celluloid globe and a celluloid flower, being glued to the upturned palms for further decorative purpose. Brahma, according to legend, originally had five heads but one was cut off by Siva for some infraction of the rules. The Hindu definition for Brahma is "the creator."

These are but a few examples of what may be accomplished with latex compounds in the field of masks and figures. Proper attention to manufacturing details permits masks of such design to be worn comfortably by the user for reasonable lengths of time. Not only are they called for in the fields already mentioned, but the coming of television is expected to open still another field.

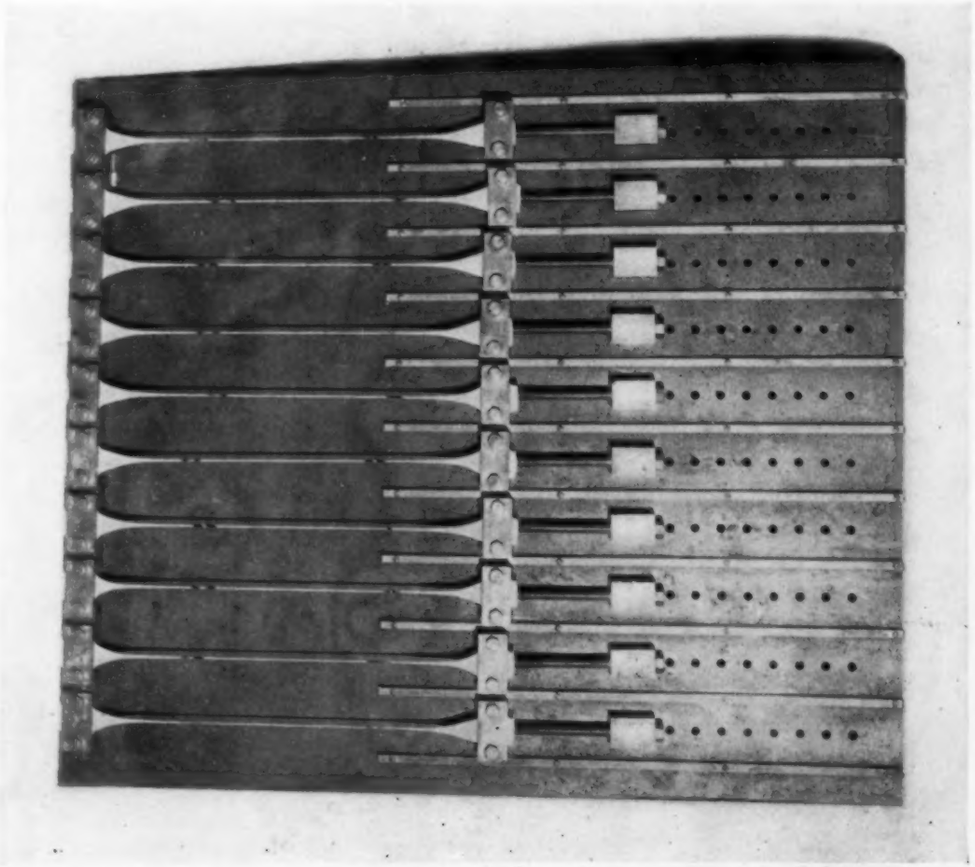
Apparatus for Permanent Set Measurement

THE NEED for an instrument which would be easy to operate and give considerable latitude in the conditions under which permanent set tests could be carried out recently led to the design and construction of a new apparatus for measuring permanent set by the New Jersey Zinc Company in its Palmerton (Pennsylvania) laboratories.

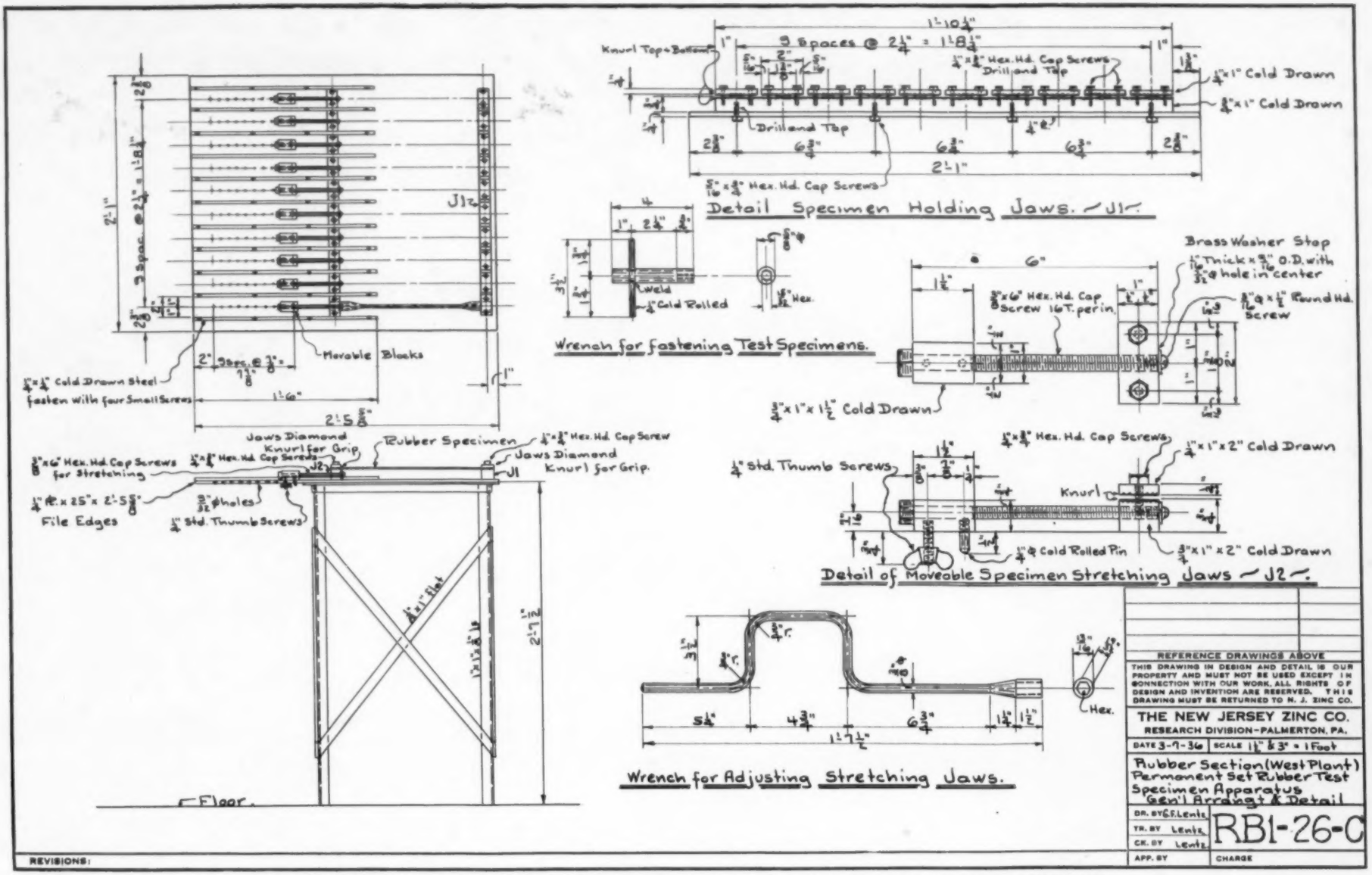
A photograph of the apparatus is shown on this page and on the following page appears a detailed working drawing of the device. According to the N. J. Zinc *Activator,* the operation is briefly as follows:

After the holders are released and the rubber specimens put in place, the movable holder is adjusted roughly by means of the holes drilled in the plate. A final adjustment to the elongation desired is then made by means of a wrench especially designed to move the jaw to the proper position. The testing cycle generally used is to elongate the specimen to 500%, hold in the stretched condition for 30 minutes, release and measure the distance between bench marks after 10 minutes have elapsed. With 10 holders one operator can work continuously, replacing a test piece each 3 minutes and making the necessary measurements. This method is more satisfactory than measuring permanent set on the ruptured test pieces, and has the same accuracy as similar pieces of testing equipment, while lending itself to a satisfactory laboratory routine procedure.

The apparatus, which measures 2′ 1″ by 2′ 5⅝″, is mounted on a specially designed table of convenient working height. The apparatus is so fastened to this table that a portion projects over the edge of the table to enable clamping the movable blocks by means of thumb screws conveniently placed underneath the apparatus. The clamping jaws, of cold drawn steel, are knurled top and bottom for gripping and are provided with cap screws to clamp the rubber test specimen. Both the movable stretching jaws and the holding jaws are operated by specially designed wrenches.



At the right is shown a plan view of the new apparatus for measuring permanent set designed and built by the Palmerton (Penna.) Laboratories of the New Jersey Zinc Company. A working drawing of this device is shown on the following page.


Detail Specimen Holding Jaws. ~J1~
Wrench for fastening Test Specimens.
Detail of Moveable Specimen Stretching Jaws ~J2~.
Wrench for Adjusting Stretching Jaws.
Floor.
Movable Blocks
Rubber Specimen
Jaws Diamond Knurl for Grip
File Edges
Brass Washer Stop
REFERENCE DRAWINGS ABOVE
THIS DRAWING IN DESIGN AND DETAIL IS OUR PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH OUR WORK. ALL RIGHTS OF DESIGN AND INVENTION ARE RESERVED. THIS DRAWING MUST BE RETURNED TO N. J. ZINC CO.
THE NEW JERSEY ZINC CO.
RESEARCH DIVISION—PALMERTON, PA.
DATE 3-9-36
SCALE 1½" & 3" = 1 Foot
Rubber Section (West Plant)
Permanent Set Rubber Test
Specimen Apparatus
Gen'l Arrangt & Detail
DR. BY G.F. Lentz
TR. BY Lentz
CK. BY Lentz
APP. BY
RB1-26-C
CHARGE
REVISIONS:

DRAWING SHOWING DETAILS OF CONSTRUCTION OF N. J. ZINC PERMANENT SET APPARATUS

This detailed drawing, prepared especially for THE RUBBER AGE, gives the complete specifications and working details of the apparatus. As exact dimensions are given in the diagram, the scale of the original drawing should be disregarded for it no longer holds true for the reduced reproduction shown here.

Rubber Division, A.C.S., Meeting in Kansas City

Five Technical Papers Will Be Presented on April 15 with Committee Reports and Business Session Set for April 16

THE Spring meeting of the Rubber Division, A.C.S., will be held on April 15 and 16, in Kansas City, Missouri, and will feature five papers in addition to a report of the Crude Rubber Committee and the regular business session. The technical papers will be presented on Wednesday afternoon, April 15, while the following morning, on April 16, the Crude Rubber Committee report will be presented, following which a business session will be held. Although it is not yet definite, all meetings and sessions of the Rubber Division will probably be held in the new Kansas City Municipal Auditorium.

C. W. Christensen, secretary of the Division, suggests that all members planning to attend the meeting make reservations at the Hotel President, one of Kansas City's newest hostelries. Headquarters and registration of the American Chemical Society will be at the Hotel Muehlebach. Provisions have been made with leading railroads for special round-trip tickets from all points at one and one-third rates. Special certificates must be secured from the secretary of the A.C.S. or, after April 1, from local secretaries. The division banquet will be held on Wednesday night, April 15.

Abstracts of the five papers to be presented, as well as the authors and the time of presentation, follow:

PROGRAM

WEDNESDAY AFTERNOON—APRIL 15

1:00—The Effect of Vulcanization on the X-Ray Diagram of Gutta-Percha. *C. S. Fuller, Bell Telephone Laboratories, Inc.*

By comparing the lattice plane spacings of pure gutta-percha hydrocarbon, of balata, and of gutta-percha vulcanized for different times at 142°C., it is shown that apparently vulcanization (to the extent employed) has no effect on the crystal structures of either the alpha or beta modifications of gutta-percha. The measurements on balata confirm the previous findings of others that the x-ray patterns of these two substances are identical.

Vulcanization is found to have an effect, however, in increasing the degree of orientation of the crystallites produced by stretching. Through this improved orientation it is possible to obtain more accurate measurements of the identity periods in the fiber direction than heretofore. Results of measurement on the beta form of gutta-percha show that the fiber period is 4.77 ± 0.03 Å or a multiple of this figure, in good agreement with previous work. The application of the graphical method of solution to this form of gutta-percha shows that the unit cell chosen by Bruni and Natta does not agree with the x-ray results. The dimensions of the unit cell found to be in best agreement with the data are: a = 15.7 or 7.85 Å, b = 4.77 or 9.54 Å (fiber axis), c = 11.9 Å. The cell appears to be orthorhombic. A number of repeating units per cell of 4 or 8 agrees with the known density of gutta-percha crystals.

No detailed treatment of the alpha form of gutta-percha is possible with the data at present available. Measurements of the fiber period of this form show anomalies which may indicate the presence of still another modification, although no satisfactory explanation of the measurements has been found.

A summary of all the measurements on gutta-percha compared with those of other authors is given. Evidence that the transition of beta to alpha gutta-percha is not always irreversible even when cooled rapidly though the transition point is found.

1:35—Changes in Properties and Structure of Carbon Black Accompanying Loss of Rubber Reinforcement Characteristics. *F. H. Amon, Godfrey L. Cabot, Inc.*

Carbon black subjected to suitable heat treatment loses its property of reinforcing rubber. Changes in chemical composition, physical structure, surface activity, and particle size accompanying this change in rubber characteristics are studied. The properties of the new product are compared with properties of other carbon pigments. Little, if any, change in particle size has taken place, but a distinct change in inner structure of the carbon black particle is indicated by x-ray examination.

2:20—Reinforcement of Rubber by Pigments. III. Comparative Rating of Rubber Gas Blacks by Heat of Wetting Measurements. *C. W. Walton and H. J. Osterhof, Goodyear Tire and Rubber Co.*

For many years no one method of rating has been considered of sufficiently general application to be termed the "standard" method for comparative rating of rubber gas black samples, either as pigments or as compounded in vulcanized stocks. Results obtained by pendulum rebound of the vulcanized stocks have apparently proved most satisfactory by plant practice and are given some precedence over those obtained by other methods. A scientific method of rating comparative rubber black samples by their relative degree of surface polarity, as derived from heat of wetting measurements, has been developed, and is found to agree in almost perfect order and with reasonable magnitude with that rating produced by relative pendulum rebound values. An attempt to correlate the relative specific or active surface area of rubber black samples, by (1) the "count" method and (2) heats of wetting with anhydrous benzene, with those physical tests now used in plant practice, failed to disclose comparisons of value.

2:55—Impact Machine for Testing the Tensile Properties of Rubber at High Speed. *George J. Albertoni, Goodyear Tire & Rubber Co.*

The impact machine described is equally applicable to the measurement of the tensile strength of rubber and to the measurement of the energy storage capacity at different elongations. (The machine is applicable to the testing of both vulcanized and unvulcanized rubber).

The operating speed is more than 25,000 cm. (10,000 inches) per minute as compared with 57.70 cm. (20-30 inches) per minute by the standard procedure. The corrections involved in the determination of values are of constant magnitude and can be determined with close approximation. The degree of duplicability of results, when the test is used to determine the energy storage capacity at break, compares to that obtainable by any slow speed machine.

The degree of duplicability is very good when the relationship between stress and strain is sought. (At the different elongations).

The simplicity of manipulations required on this type of test leads to the possibility of its use as a method of routine control.

3:25—The Pendulum as a Source of Energy for Plasticity Measurements. *Ira Williams, E. I. du Pont de Nemours & Co., Inc.*

A pendulum of known potential energy is used to produce a definite, rapid deformation in a plastic material. The dampening effect produced on the pendulum is a measure of the energy expended to produce the deformation. The elastic recovery following the rapid deformation is much greater than that obtained with the ordinary parallel plate instrument. The actual measurement of the energy consumed and elastic recovery require less than one minute.

THURSDAY MORNING—APRIL 16

10:00—Report of Crude Rubber Committee.
10:45—Business Session.

Note: Discussions will follow each paper presented.

Rubber Stands Unusual Test

HOLDING high gravity East Texas crude oil against working pressures of 900 pounds per square inch for over four years in a main line pipe coupling, the rubber joint rings were recently taken out of service only because the pipe could no longer

carry the oil quantity demanded. At the time this line was replaced with a larger one the rubbers forming the working seal of these joints were examined carefully for signs of failure, either of deformation under the severe pressure, or through deterioration from the action of the oil on the rubber. Graphic proof of the ability of these rubber joint rings to stand up to the heavy service and yet retain their elasticity and tensile strength is offered by the photograph, which shows an 85-pound German police dog pitted against a 190-pound man, with the joint ring as sole link in the chain. As a final test the dog was swung clear of the ground and whirled through two complete circles while her teeth held on the rubber—without the unyielding grip damaging the surface, or the less than one-half square inch of rubber ring section failing. Fitted again over four-inch pipe after being stretched to twice its normal length by the jerking, twisting tugs of the dog, the rubber hugged the pipe as tightly as when new. This informal demonstration did much toward convincing the engineers of the value of rubber joint rings.

Netherlands' Shipments in 1935

IT was apparent early in the life of the International Rubber Regulation Agreement, that the crux of restriction was the controlling of native rubber shipments from the Netherlands East Indies. Various efforts have been put forth by the Dutch Government to secure such control, principally a steady raising of export duties, and more recently an attempt to apply individual restriction to native rubber gardens. Statistics compiled by the Commodity Exchange, Inc., show that during the year of 1935 estate shipments were 12,787 tons under the permissible quota, while native shipments were 29,683 in excess of the permissible quota, leaving a total of 16,896 tons for the Netherlands as an excess total. Complete figures for both native and estate shipments from the Netherlands East Indies for the twelve months of 1935 follow:

1935—NET EXPORTS UNDER RESTRICTION
NETHERLANDS EAST INDIES

ESTATE RUBBER

Month	Permissible	Actual	Excess (+) or Deficiency (—)
January	14,577	9,017	— 5,560
February	14,577	10,922	— 3,655
March	14,577	13,503	— 1,074
April	13,605	12,565	— 1,040
May	13,606	14,018	+ 412
June	13,606	14,992	+ 1,386
July	12,634	12,893	+ 259
August	12,634	11,441	— 1,193
September	12,633	10,838	— 1,795
October	11,661	10,636	— 1,025
November	11,662	8,315	— 3,347
December	11,662	15,507	+ 3,845
Total	157,434	144,647	—12,787

NATIVE RUBBER

Month	Permissible	Actual	Excess (+) or Deficiency (—)
January	10,423	9,604	— 819
February	10,423	16,905	+ 6,482
March	10,423	8,882	— 1,541
April	9,728	13,586	+ 3,858
May	9,728	22,232	+12,504
June	9,727	14,298	+ 4,571
July	9,033	8,084	— 949
August	9,033	9,701	+ 668
September	9,033	9,609	+ 576
October	8,339	17,526	+ 9,187
November	8,338	9,035	+ 697
December	8,338	2,787	— 5,551
Total	112,566	142,249	+29,683

NOTE: ALL FIGURES ARE IN LONG TONS

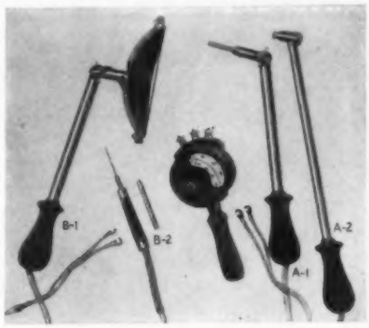
Everlastic Textile Coverings

A LINE of textile roll coverings, under the name of Everlastic, which uses du Pont's DuPrene as the basic ingredient, has been introduced to the textile industry by Roger W. Cutler, of Boston. The covers are oil-proof and unaffected by temperature changes and are said to have unusual durability. They possess the ability to draw all the fibers evenly because of the frictional surface of the covers made possible by the use of the synthetic rubber. Other claims for the new roll coverings include the following: they are extremely resilient and will not flute; they are non-oxidizing and are unaffected by any unusual amount of ozone; they may be grounded, buffed and easily cemented to the arbors with a firm bond.

New Equipment

Surface and Needle Pyrometer

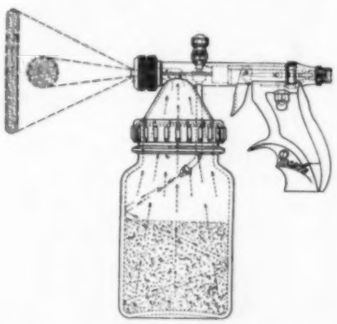
A NEW set of combination surface and needle pyrometers which finds particular application in the rubber and plastic industries has been developed by the Pyrometer Instrument Company, 103 Lafayette



Street, New York City. By interchanging the various types of thermocouples the instrument is transformed into four different types of surface and needle pyrometers. The indicator is equipped with the Pyro clamping device whereby contact and reading of actual temperatures need not be made simultaneously, the indicating needle remaining fixed at the correct temperature indication. The indicator has two scales from 30° F. to 400° F., marked "A" and "B" with the respective scale ("A" and "B") engraved on the metal tube of the attachments. The improved pyrometer can be used to determine the temperature of molds used in the manufacture of plastic or semi-plastic material, for flat surfaces, for determining temperatures of stationary or moving rolls, and inside temperatures of various materials in the plastic state during certain operations.

Paasche Spray Gun

DESIGNED to handle flock, powder or granules, a new type of spray gun has been developed by the Paasche Airbrush Company, of Chicago. It is said to produce attractive suede-like finishes at reasonable cost on any materials including rubber and metal. It is also adaptable for applying dry powders, such as coating rubber molds with dry soapstone or mica. A pistol grip and trigger control makes for easy handling



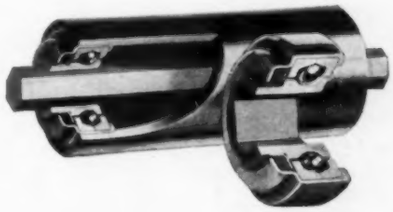
of this spray gun, the multiple head of which can be adjusted to deliver a round spray or one that is flat and fan shaped.

Two-Platen Hydraulic Press

SIMILAR in design and operation to the hydraulic press which uses oil as the fluid medium described in the February, 1936, issue of THE RUBBER AGE, the Farrel-Birmingham Company, Inc., Ansonia, Conn., has brought out another model constructed on a larger scale. The new model is of 140 tons capacity and has two platens, each 60 inches wide and 30 inches deep. Two 8-inch diameter rams working in the cylinders, which are integral with the bottom crosshead casting, provide a pressure of 150 lbs. per square inch over the platen area. As in the smaller model, this hydraulic press uses only one valve to operate, the opening or closing of which starts and stops the press.

Mathews Hexagon Shaped Axles

A NEW addition to its line of "knurled-keylock" roller conveyors in the form of rollers incorporating hexagon shaped axles has been announced by the Mathews Conveyor Company, Ellwood City, Penna. The new addition will embrace practically all of the present sizes plus several intermediate sizes not heretofore available. Seamless steel tubing, hardened steel bearing parts, solid steel inner and outer ball races predominate in the new axles. Ball bearing rollers in lengths to suit various diameters are available. Additions added to the hexagon axle line which were

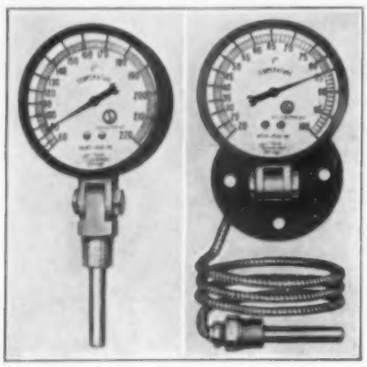


not available in the "knurled-keylock" series include a tapered steel roller 2½ to 1⅝ inches in diameter, capacity 150 lbs; a 2½ inch diameter roller for heavy service, of 300 lbs. capacity; a 4 inch diameter roller, 3,000 lbs. capacity; etc. The illustration is a sectional view showing the adaptation of hexagon axles as used in ball bearing conveyor rollers.

Socket Dial Thermometers

TWO types of socket dial thermometers, self contained and distant reading, known as Types 61 and 62 respectively, have been introduced by the Jas. P. Marsh Corporation, 2073 Southport Avenue, Chicago. The self-contained instrument fitted with the Marsh Universal socket permits its use as a vertical connection thermometer, a 90° back angle thermometer, a front angle thermometer, or any intermediate angle. It eliminates the requirement of specifying a specific type of stem for each application. The distant reading thermometer is standard with 6 feet of connecting tubing and a union bulb

or a flexible plain bulb. It has a mounting flange together with the socket permitting installation of the instrument proper at any convenient point of the apparatus involved or on a wall or pillar, with the bulb installed at the point of temperature. The gradu-



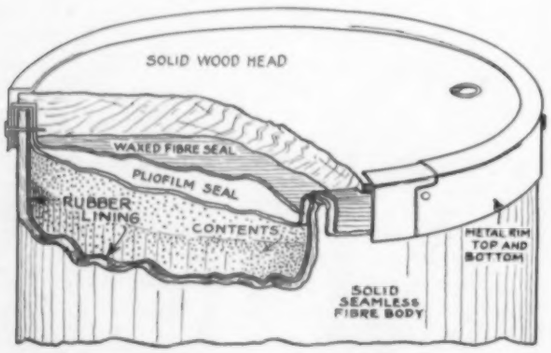
ation are on the dial of both of these thermometers and the distance traveled by the pointer is equivalent to approximately the operating scale length found on most 9-inch scale size industrial thermometers of the glass tube type.

Carpenter Latex Coated Drums

AFTER extensive experimentation, the Carpenter Container Company, of Brooklyn, New York, has introduced a line of latex coated fiber drums. Made with a solid seamless fiber body, the inner wall of these drums is coated with a vulcanized latex composition, the drums then being rotated to spread the coating uniformly over the treated surface.

The latex composition seeps into the crevices around the bottom of the container, to form a seamless coating which makes the container air-tight and leak-proof. The coating, due to its composition, adheres firmly to the bottom and wall of the drum and may be stripped off only with difficulty.

To guard against any possibility of leakage around the cover, a Pliofilm seal, which overlaps the top of the drums, is used in addition to a sift-proof fiber seal. A solid wood, snug fitting cover is used, a hinged metal rim, provided with openings for nails to be driven through, holding the cover, as well as both the Pliofilm and fiber seals, tightly in position. A conveni-



Cut-away section showing protective seals of drum

ent pull out ring is provided on the wood head. The same type of hinged metal rim is also used on the bottom of these drums.

According to Henry Craemer, sales manager of the Carpenter Container Company, the new latex coated fiber drums are suitable for solids and semi-liquid materials, although the technical department conducts extensive tests on each type of material intended for shipment in them. In addition to their use as shipping drums, it is pointed out that these containers may also serve as an actual part of manufacturing process equipment in that they may be put to use as dripping "tanks" if the material in the container can be used for that purpose without further processing. Any size Carpenter container, up to 60 gallon capacity, can be treated in the manner described.

Goodall Rubber Liners for Barrels

FOR USE in connection with special types of steel barrels, the Whitehead Bros. Rubber Co., of Trenton, N. J., is furnishing "Snap-in" removable rubber liners suitable for the shipment of various chemicals, particularly sodium hypochlorite (laundry bleach). These liners are actually vulcanized rubber

Liner being inserted in barrel

Liner being snapped into place

bags, and are inserted in the steel barrels which are equipped with four metal snaps, the liners being so designed that they overlap the rim of the barrel and are held tightly in place by the metal fasteners in their "snapped" position. According to Whitehead Bros. these removable liners avoid the danger of trapped gas, are economical in that damages are readily repaired, and offer many other advantages. Two types of bleach barrels are available, in 30 and 50 gallon capacities, one of which is designed for companies desiring the "Snap-in" firmly attached at the rim of the barrel.

Book Reviews

Glances at Industrial Research. By Edward R. Weidlin and William A. Hamor. Published by Reinhold Publishing Corp., 330 West 42nd Street, New York City. 238 pp. $2.75.

The object of this book, written in the form of a treatise, is not particularly to give a descriptive account of recent industrial research progress, but rather to tell of the contributing part in research played by the Mellon Institute of Industrial Research, the co-authors being members of that organization. This object is well accomplished, but recent advances in industrial research are not ignored. A well-knit story is told in semi-informal style, a by-line to the title informing the reader that these "glances at industrial research" were taken "during walks and talks in Mellon Institute." Late advances, present status and future opportunities of industrial research are covered. The book also includes chapters on subjects of industrial management, scientific study and development. It includes 25 illustrations and a combined author and subject index.

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Rubber: Some Facts on Its History, Production and Manufacture. Prepared by P. W. Barker. Issued by the Leather and Rubber Division, Department of Commerce, Washington. 26 pp.

Consisting of fundamental facts with regard to rubber cultivation and manufacturing processes, this booklet was prepared to furnish general information to school children, college students and the general public. More attention is given the subject of cultivation than to rubber manufacturing. A brief history is included which makes mention of the more important discoveries and their discoverers, such as La Condamine, Priestly, Hancock, Goodyear, etc. On the subject of cultivation such topics as planting, tapping, latex collection, coagulation, bud grafting and seed selection are briefly discussed. A series of hand drawings bears out the text. The booklet is to be recommended to the novice.

•

Precision Measuring Instruments. Issued by the Federal Products Corporation, 1144 Eddy Street, Providence, Rhode Island. 60 pp.

This catalog is devoted to the 1936 line of dial indicators and precision measuring instruments featured by the Federal Products Corporation. Among the dial indicators described and illustrated are several applicable to semi-compressible materials such as rubber. Thickness gauges, extensively used in the rubber industry, are also illustrated and described, one model (59) having been specifically designed to specifications for Firestone. A large number of measuring devices are covered in the catalog.

•

Recording Thermometers. (Bulletin 198). Distributed by The Foxboro Company, Foxboro, Massachusetts. 48 pp.

Thermometers for every industrial use are described, discussed and illustrated in this latest Foxboro catalog. A section is devoted to thermal systems, giving a detailed description of each type employed, together with its characteristics and advantages. Another section is devoted to temperature recorders, while still another describes pertinent applications. Charts, tables and data sheets round out the catalog.

•

Engineering Achievements. Prepared and published by the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania. 56 pp.

Electrical engineering achievements in the past fifty years, ranging from household utilities to enormous industrial projects, accomplished by Westinghouse are detailed in this "Golden Jubilee" booklet. It is profusely illustrated and represents a complete record of Westinghouse's role in the development of American industry.

Index to A.S.T.M. Standards and Tentative Standards. Issued by the American Society for Testing Materials, 260 S. Broad Street, Philadelphia, Penna. 160 pp.

This index is of service in ascertaining whether the A.S.T.M. has issued any standard specifications or test methods covering particular engineering materials or subjects. It is also of help in conveniently locating any of the standards in the regular publications issued by the Society. Information is furnished on all of the 794 A.S.T.M. standards and tentative standards as of January 1, 1936. As a convenience, a list is given of the specifications and tests in numeric sequence of their serial designations.

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Royal Berlin Laboratory Porcelain Ware. (RB 250). Issued by the Fish-Schurman Corp., 230 East 45th Street, New York City. 8 pp.

The line of Royal Berlin porcelain ware for use in laboratories, distributed in this country by the Fish-Schurman Corporation, is described in this catalog. Various types of porcelain ware, for use in different temperatures, are discussed with the melting points of each type given. Special utensils for micro-analytical methods are also included. The items include filtering crucibles, filtering tubes, suction funnels, combustion tubes, etc. Prices on all items are quoted.

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Sur La Saignée de L'Hevea. By Francois-J. Gain Published by Imprimerie Georges Thomas, Solignac and Henri-Lepage Streets, Nancy, France. 162 pp. 30 Francs.

Written entirely in French, this book (as its title indicates) is devoted to methods of tapping rubber trees. It consists of an introduction, three chapters and a section devoted to the author's general conclusions on the tapping methods discussed. The history of tapping, from early crude methods to the technically-controlled methods now in use, is covered. The subject matter is of particular interest to rubber cultivators, of course, but should also prove of interest to rubber manufacturers.

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Apparatus for Testing Petroleum Products (Catalog No. 160). Prepared and distributed by the Precision Scientific Company, 1749 North Springfield Avenue, Chicago.

In addition to containing specifications and references to governing standards, notably those of the A. S. T. M., this catalog is compiled and arranged for quick, convenient reference on all types of apparatus involved in testing petroleum products. An A. S. T. M. reference index is included which indicates the apparatus necessary for each designation. Information on general utility equipment for the laboratory, such as burners, heaters and hot plates, constant temperature baths, etc., is also part of this catalog.

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Save-Lite. An Analysis of Plant Conditioning. Prepared and distributed by the Sherwin-Williams Company, Cleveland, Ohio. 34 pp.

Prepared with the cooperation of the Better Vision Institute and Better Light-Better Sight Council, this catalog is a factual presentation of painting as a part of lighting and "plant conditioning." Different types of wall and ceiling paint are described. Illustrated laboratory studies and various industrial applications are included. The booklet also covers case histories, simple charts on lighting standards and plant interior paint uses.

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Ten Facts on Technology and Employment. Published by the Machinery and Allied Products Institute, 221 North La Salle Street, Chicago.

Termed "a statistical proof of the contribution of machinery to the creation of employment and a higher standard of living," this booklet presents ten facts (in ten paragraphs) purported to reveal machinery as a creator of jobs rather than a destroyer of employment opportunities. The "facts" represent a study of technological advancement made by the Machinery Institute. It is recommended to those interested in the specific issue involved.

Editorial Comment

Quantity Purchasing

ONE result of the "cease and desist" order given Goodyear by the Federal Trade Commission on its sale of tires to Sears, Roebuck & Company, has been an impetus for enactment of the Robinson-Patman "anti-chain store" bill now pending in Congress. The bill is designed to abolish the system of quantity price discounts and many of its points where covered in the FTC decision with regard to the Goodyear-Sears tire contract.

President Litchfield, of Goodyear, in stating that the "practice is on trial, not Goodyear" emphasizes that if the decision is allowed to stand (Goodyear is appealing it) it would "wipe out a widely used trade practice under which a substantial proportion of the country's retail business is done" and would lead, in the tire business, to "total disruption of the price structure."

Although enactment of the Robinson-Patman bill might help the independents somewhat, it is seriously doubtful whether it would be of sufficient aid to enable them to more effectively fight the "chains." At that, why shouldn't quantity purchasing be entitled to a more liberal price range, whether in the form of discounts, rebates, or the like?

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Arbitration Board Needed

AS this is being written the strike at Goodyear has entered its nineteenth day without any indication from either side as to an early settlement. If anything, the situation grows more tense daily as Goodyear authorities keep insisting that Akron's enforcement agencies give full protection to non-strikers desirous of returning to work. One weak attempt was made by the Sheriff's office to clear a path through the strikers congregated in front of the plant despite the fact that an injunction secured by Goodyear limits pickets to ten at each factory entrance. The attempt was a fiasco.

According to reports, the strike was the outgrowth of a "sit-down" which was the result of an announcement by Goodyear that certain piece work wages were to be reduced. In a broader sense, however, the threatened reduction was merely an "excuse" for the strike which has been brewing ever since the agreement entered into between Goodyear, Goodrich and Firestone with their respective unions, last year. Since that agreement there has come into being the United Rubberworkers of America, an autonomous, vertical union which has thrown its weight behind the strike.

As in all recent labor disputes, no matter what the cause, sooner or later the union demands two things along with its other demands, viz: union recognition (tantamount to a closed shop), and abolishment of any existing so-termed company union.

Irrespective of the rights or wrongs involved in the Goodyear situation, one all-important fact presents itself: If labor disputes, present and future, are to be avoided as much as possible, it is essential that some sort of arbitration organization be set up, backed by Government decree, with sufficient power to enforce its decisions. An organization similar to the former labor relation board which died along with the N.R.A. seems necessary.

Time after time situations such as the one at Goodyear, where strikers refuse to permit anything or anyone to enter the plant and where the management refuses to arbitrate while the strikers are out, have finally yielded to arbitration. The bitterness, the losses, the after-results of strikes are needless. Unless the factory is allowed to rot, the workers to starve or seek other fields of employment, or bloodshed and violence is utilized, the issues must be arbitrated.

Although Congress was halted and reprimanded by the Supreme Court where the former labor relations board was concerned, on the ground that it did not have the authority to regulate commerce or "local matters," it is still possible to set up a board of arbitration with sufficient authority without wielding a "big stick"—by public referendum if necessary. The need is obvious.

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Hedging Operations

THE purchase of a seat on the New York Commodity Exchange by Sears, Roebuck & Company recently, is but a forerunner of similar action on the part of many other retail distributing organizations which approach the mail order house in size. The move is termed "a piece of scientific business planning."

By virtue of its seat on the Exchange, Sears will safeguard itself against possible inflationary trends because of its close contact with commodity developments; it can hedge through the purchase of raw commodities in advance of the selling season; and secures still other advantages over competition. The move is a logical one for every big retail distributor because of the large scale advance orders they must place.

Among commodities handled on the Exchange are rubber, hides, silk, gasoline and crude oil, etc. Rubber, particularly, due to its fluctuations based on the current restriction scheme, is of interest to Sears in its position as the largest retail distributor of tires in this country.

CURRENT • NEWS
of the Rubber Industry

MARCH, 1936

FTC Finds Goodyear-Sears Tire Contract Affords "Unjustifiable Discrimination"

Federal Trade Body Finds an "Unjustified" Price Discrimination Ranging Between 32 to 53% which "Tends to Monopoly"—Goodyear Appealing Decision

IN A DECISION handed down on March 2, by the Federal Trade Commission at Washington, the Goodyear Tire & Rubber Company, and subsidiaries, were ordered to "cease and desist" from discriminating in price in favor of Sears, Roebuck & Company which discrimination, according to the decision, was driving many independent dealers out of business and was tending to create a monopoly. Immediately upon publication of the decision, Paul W. Litchfield, president of Goodyear, announced that the case would be carried up to the Federal courts on appeal. The decision was the result of the two-year investigation of the Goodyear-Sears tire contract which involved 23,000 exhibits, 400 witnesses, 5,000,000 words of recorded testimony, and 25,000 typewritten pages of argument.

Four major charges involving violation of the Clayton Anti-Trust Law were made by the Commission, as follows: (1) that the gross discrimination in favor of Sears ranged from 32 to 53%; (2) that the net average sales price discrimination over the period of the contract varied from 29 to 40%; (3) that the total discrimination amounted to approximately $41,000,000, or about 26% of the aggregate net sales price to independent dealers on a business volume comparable to that of Sears; and (4) that Goodyear concealed the prices and terms at which it was selling tires to Sears from its own sales organization and from the trade generally and that Sears was thus enabled to sell tires at prices which drove many independent dealers and small tire manufacturers out of business.

Discrimination "Not Justified"

Referring specifically to the price discrimination it found, the Commission's order states that "it was not justified on account of differences in the grade, quality or quantity of the commodity sold, or by difference in the cost of selling or transportation, or by good faith to meet competition, and it (price discrimination) had the effect of substantially lessening competition and tending to create a monopoly." Because of these findings, the Commission's order leaves Goodyear free "to remove the discrimination either by increasing its price to Sears, Roebuck & Company, or by lowering its prices to its other customers."

No Mention of Contract Made

Although the FTC held that the tire contract "was a secret agreement entered into under which Goodyear assigned to Sears 18,000 shares of Goodyear common stock and also paid to Sears $800,000 in cash to be used in the purchase of 32,000 additional shares" for the alleged purpose of not opening the bid to competition, the order does not make any direct mention of the contract, merely demanding that Goodyear "cease and desist" from discriminating against independents. It has long been the claim of independent dealers that special discounts were not based on quantity but actually consisted of "special favors."

Again referring to Sears' position in the retail tire industry, the FTC order states that "Sears, in fact, has persistently, substantially and systematically undersold such dealers (independents) by pricing for the consumer market the tires which it had so purchased from the respondent (Goodyear) at prices ranging from 20 to 25% lower than the prices placed upon tires of comparable grades and quality sold by other retail dealers in the market, except in the year 1933, when due to outside pressure, Sears' prices were only approximately 10% lower."

The order further states that Sears "usually led in price declines during the period covered by the contracts (from 1926 through 1933) and with the low price aggressively pushed the sale of its tires by the use of numerous sales devices, such as excessive guarantees, free tube offers and trade-in allowances." From 1926 to 1930, according to the findings, Sears' volume of business increased "more rapidly than any other retail distributor . . . and it is still the largest retail distributor of tires in the United States."

In their ruling, the commissioners further declared that the practice of giving large discounts is not justified; that such discrimination when made merely on account of size tends toward monopoly and the suppression of competition; that a manufacturer if allowed to follow such practice might hand over the whole trade in his line of commerce to a few or a single dealer; and that a manufacturer has no right, under the Clayton Act, to put dealers to any destructive disadvantage by any unjustified discrimination.

In announcing Goodyear's intention to appeal the decision to the Federal courts, Mr. Litchfield expressed surprise that "a government professing to stand for the masses of consumers could undertake to block such an arrangement," one that has brought low prices to many lines of merchandise. He referred to other industries where quantity discounts are allowed on private brand merchandise and stated that "the practice itself is on trial, not Goodyear." If the decision should stand, according to Mr. Litchfield, it would mean ultimately increased living cost for millions of consumers, decreases in the volume of commodity sales, and in the case of the tire business "total disruption of the whole price structure with irreparable damage to tire dealers everywhere."

Some Discrimination Admitted

Throughout the entire defense of its contract with Sears, Goodyear has admitted to a price discrimination, but one of only a small enough percentage to come within the range permitted by the anti-trust laws. A final decision in the controversy will probably be a matter of years since even if the Federal courts sustain the FTC ruling, Goodyear still has the right to petition the case for final adjudication to the Supreme Court on a *writ of certiorari*.

SEE EARLY ENDING OF GOODYEAR STRIKE

An early ending to the strike at the Goodyear Tire and Rubber Company, at Akron, an outgrowth of the "sit-down" protest over piece work wage reductions on February 3, which has been raging for almost a full month, is visualized as this issue goes to press. A secret meeting of the Goodyear union was held on Sunday night, March 8, immediately followed by secret negotiations between high Goodyear officials and union representatives.

The entire Goodyear factory has been virtually at a standstill ever since picketing started, the pickets refusing to permit anyone to enter the factory, including office workers, and barring all shipments to or deliveries from the factory. Starting as an "outlaw" walkout, the strike later received official backing when the United Rubberworkers of America voted its approval of the action.

Although the situation at Akron has been tense, with repeated threats of a general strike, no actual violence has occurred of any consequence. Strikers, non-strikers and Goodyear officials have delivered impassioned orations to the Akron public over the radio and through newspaper advertisements. Not until recently, however, has there been a possibility of mediation of the problems. One plan, submitted to both sides by Edward A. McGrady, labor conciliator from Washington, received scant consideration.

It is believed that the present negotiations between the Goodyear management and union representatives, upon which hopes for settling the dispute are based, are concerned with possible restoration of all pay cuts since January 1, an impartial vote on preference in labor representation, and the establishment of some basis for permanent labor relations. Union recognition, therefore, would depend upon the outcome of the impartial vote, if approved by Goodyear authorities.

If the secret negotiations are not successful in the next few days there are justified fears that the situation may develop into a "showdown" between rubber manufacturers and the rubber union, in which case workers from all affiliated locals would be called out and practically all of the larger rubber factories in the country would be tied-up for some time.

Issues Patent Warning

In a full-page advertisement inserted in several of the toy trade papers, A. J. Musselman, president of the Musselman Products Company, Cleveland, Ohio, issued a warning that tires are being sold that infringe on the single-tube Doenut tire developed and patented by himself over a fifteen-year period. The patent was granted in 1935.

LATE NEWS

Pennsylvania Strike

The strike of 850 employes at the Pennsylvania Rubber Company at Jeannette, Penna., was settled on March 9 in a memorandum signed by Pennsylvania but not in the form of a signed agreement between the company and the union. Union recognition, seniority rights and minimum wage increases are claimed by the rubber union.

See Columbia Peace

Early settlement of the strike at the Columbia Chemical Company, Barberton, Ohio, was visualized as the Columbia union voted on a plan on March 9. The strike, involving 900 workers, has been waged since February 18 when a "sit-down" protest was launched by the union over refusal of hourly wage increases for pipefitters.

Loss for Fisk Rubber

Fisk Rubber Corporation, Chicopee Falls, Mass., reports a net loss of $274,775 for the year ended December 31, 1935, after providing for depreciation and Federal taxes of $508,763. Net sales for the year were $10,878,842, or 6.36% over 1934. The report again points out that the amount of taxes paid, of all kinds, is approximately 10 cents of every dollar of net sales.

Recent Changes

R. E. Murray, purchasing agent for the Kelly-Springfield Tire Company, at Cumberland, Maryland, for the past nineteen years, has left to join the Sylvania Industrial Corp., of New York City. . . . E. J. Thomas, recently returned from England, has resumed his former position as general superintendent of Goodyear at Akron. . . . E. V. Carlquist, advertising manager, Thermoid Rubber Company, has resigned to join Fuller & Smith and Ross, Cleveland advertising agency.

Issuing Weekly Survey

Publication of a weekly survey, which includes rubber statistics, has been inaugurated by the Commodity Exchange, Inc. The weekly surveys, made necessary by the growing amount of statistical information received almost daily by the Exchange, are available without charge to daily market report subscribers, a $2.50 annual charge being made to subscribers of the monthly statistical supplements only, and a $5.00 annual charge being made to all others interested in securing regular copies. In addition to rubber, statistics on raw silk, hides, tin, copper, etc., are given.

N. Y. RUBBER GROUP WIIL MEET APRIL 10

The next meeting of the New York Group, Rubber Division, A.C.S., will be held on Friday, April 10, at the Building Trades Club, 2 Park Avenue, in New York City. Dinner will be served promptly at 6:30 P.M.

Two speakers have been scheduled. Colonel A. F. Townsend, chairman of the board, Raybestos-Manhattan, Inc., and the American delegate to the restriction committee, will speak on "Operations of the International Rubber Regulation Committee," while D. A. Comes, of Farrel-Birmingham Company, Inc., will deliver a paper on "Hot vs. Cold Break Down."

As usual, tickets are selling at $2.00 each and can be secured from the secretary of the group, Peter P. Pinto, c/o THE RUBBER AGE, 250 West 57th Street, New York City. The secretary urges all members and guests to forward orders or reservations as far in advance of the meeting as possible so that the committee in charge will know the exact number of attendants.

Group Meetings Held

As this issue goes to press, both the Chicago Group, Rubber Division, A. C. S., and the Rhode Island Rubber Club are holding meetings. The Chicago meeting is being held at the Adventurers Club, in Chicago, on March 13, through the courtesy of J. C. Nichols, noted sportsman, who will present a motion picture on "Game Hunting in Wyoming." Mr. Harold F. Wakefield, of the Bakelite Corporation, will speak on "Synthetic Resins in the Rubber Industry." The Rhode Island Rubber Club is meeting on March 12, at the Narragansett Hotel, in Providence, with John M. Bierer, factory manager, Boston Woven Hose and Rubber Company, speaking on "Experiences in the Rubber Industry During the Past 25 Years," and Alton Hall Blackington, famous news photographer, lecturing on "The Romance of News Gathering," with illustrated slides and motion pictures.

Open New Rubber Exchange

The new London Rubber Exchange, located in the recently completed Plantation House, on Fenchurch Street, in London, England, was officially inaugurated on February 7. The new exchange is a spacious, airy building, with rubber floors, marble walls and large copper doors. On one side of the main floor there is an array of telephone booths. Throughout the building there are many private offices and "booths" for the transaction of sales. Plantation House also has provisions for tea sale rooms and other commodities. Sir Walter Runciman, president of the London Board of Trade, presided over the opening ceremonies while H. D. Cowan, chairman of the Rubber Trade Association of London, acted as general chairman.

RUBBER SCIENTISTS DOUBT GERMAN CLAIMS

In opening the annual German automobile show in Berlin on February 16, Chancellor Adolf Hitler stated that Germany had solved her tire problem through the development of synthetic rubber tires with a durability 10 to 30% greater than that of tires made from natural rubber. According to reports, the German Dye Trust confirmed Hitler's declaration stating that large orders for new tires made of "buna" (the name given the synthetic rubber produced by the Trust) had been placed by the German army, postal service and state railways' bus lines.

Both the declaration and the confirmation have been met with serious doubt on the part of rubber scientists in this country and abroad. It is definitely known that the cost of synthetic rubber produced in Germany is several times that of natural rubber, but because of the shortage of foreign currency in that country the Reich is known to be willing to pay a relatively higher figure in marks. Much of the doubt, however, rests on the statement that the tires have a durability "10 to 30% greater than ordinary tires."

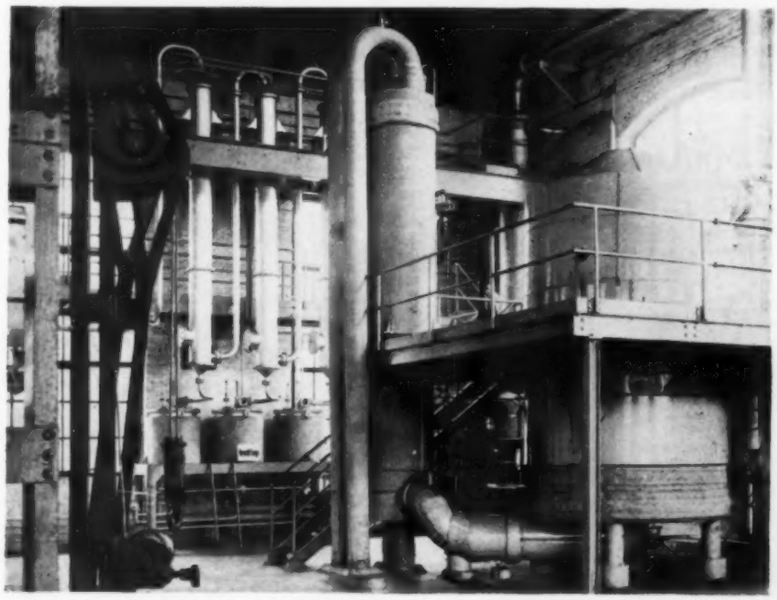
J. W. Schade, Goodrich research director, stated that "Germany has been compelled by government edict to use synthetic rubber derived from petroleum for some time, but I don't believe it is probable that it has been developed to a point where it is better than the natural rubber. During the World War Germany used methyl rubber, which was not at all satisfactory." Mr. Schade revealed that he has been trying to obtain samples from Germany, and Russia as well, for some time for testing purposes, but "our requests have not been answered."

Further claims for the German synthetic rubber tires made by the Chancellor included an assertion that the substitute (ersatz) product resisted deterioration from exposure to a higher degree than the real article. He also alleged that the tires had been subjected to severe utility tests by both the army and postal service over distances of 6,000 miles and demonstrated their superiority over those made of natural rubber in points of resiliency and durability.

Little information has been published on the method used by I. G. Farben, the dye trust, in making synthetic rubber other than that the basic components are lime and coke, subjected to calcination in an electric furnace to form calcium carbide.

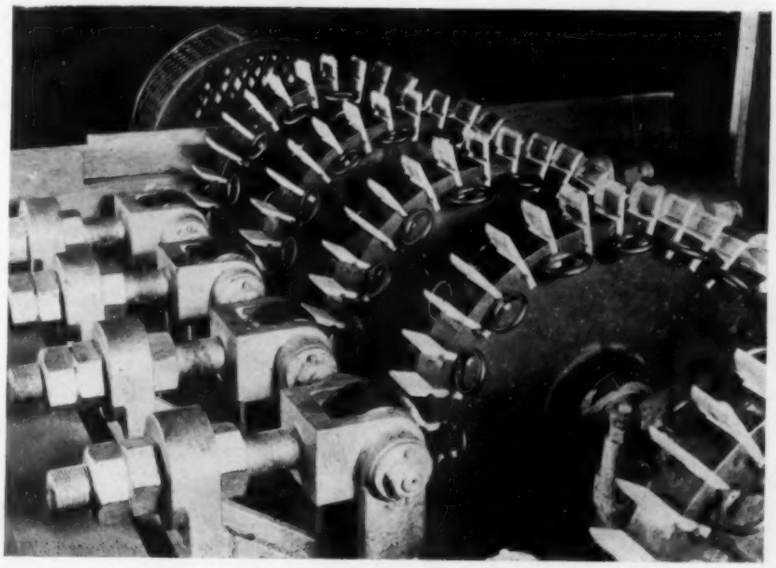
German scientific circles have remained conspicuously quiet about Hitler's statement, according to report, preferring to wait until more definite clarification of the subject is made. Consensus of opinion, however, has it that it will be a long time until the synthetic product can match natural rubber in either quality or price.

In 1935 Germany imported 130,000,000 pounds of crude rubber, at a rate averaging 10 cents per pound.



Above: The complicated machinery used in the manufacture of "buna," the German term for synthetic rubber produced by I. G. Farben (the German dye trust) is seen in this photograph, the first to be reproduced in this country. It presumably represents an interior view of the Farben factory.

FIRST PICTURES OF GERMAN SYNTHETIC RUBBER



Right: The flexing machine seen in this photograph was displayed at the recent German Automobile Show in Berlin, and was used to demonstrate the durability and resiliency of "buna," pieces of which are seen in the rotating device being forced against rollers.

(Photos by Acme).

Goodrich 1936 Advertising

Advertising plans of the B. F. Goodrich Company for 1936 include the use of 5,000 billboards devoted to its Silvertown brand of tires. The program, described as the "strongest in Goodrich history," covers the use of a large number of magazines, farm journals and daily newspapers, with safety as the advertising theme. The slogan "Best in the Long Run" is being revived and will appear as "runners" in many of the planned newspaper announcements. Increased cooperation with its dealers is also planned by Goodrich which embraces a larger share of the cost of several items of local advertising.

GARTHWAITE PREDICTS PRICE STABILIZATION

Upon his return from an extended trip through the West, A. A. Garthwaite, vice-president and general manager of the Lee Tire and Rubber Company, of Conshohocken, Penna., visualized sound policies in manufacture and distribution based on his observations and predicted early price stabilization. He noted a definite attempt on the part of tire merchants to "do business at a fair price and fair profit rather than simply turning over merchandise without profit, which has been the business treadmill for the last few years."

In summing up his observations, Mr. Garthwaite stated that business seems to be in a healthy state, stocks of goods are conservative, turn-over is being accelerated, prices are firmer, and stocks of distressed merchandise are being disposed of rapidly. He further stated:

"Today's stocks are priced on a more normal cost of material and manufacture. This is illustrated in the rubber business. The average price of rubber in 1932 was 3.362 cents per pound; 1933—5.960 cents per pound; 1934—12.892 cents per pound; 1935 (11 months)—12.249 cents per pound. Goods made of this subnormal cost material have been consumed and future production will be on a more stabilized level of prices that will permit a sound prosperity where efficient manufacturing and distribution prevail. All business can look forward to keen competition in 1936, with probably a far more careful observation of the rules and with far less of the short-sighted price cutting."

Inland Conducting Classes

Two separate classes in the study of rubber are being conducted by the Inland Manufacturing Company, of Dayton, Ohio, under the supervision of J. F. McWhorter. The courses, recently inaugurated, will extend 12 weeks and will be completed some time in April. Approximately 70 students are in the elementary class studying rubber from the time it is tapped until ready for processing. The second class is an advanced group studying molding, processing, manufacturing, and other problems. Mimeographed copies of each lecture are distributed to the students and examinations will be held at the end of the course. Company employes who appear likely prospects for future rubber executive positions are given preference in the selection of students.

Form New Latex Concern

A new plant for converting and processing latex has been opened by the recently-formed Dewitex Company at 605 South Second Street, Milwaukee, Wisconsin. Henry J. Dewitz, president, is a rubber chemist with considerable latex experience and was formerly manager of the latex division of the Topp Oil and Supply Company, of Milwaukee.

Bendix Absorbs Peco

The Peco Manufacturing Company, of Philadelphia, has become a subsidiary of the Bendix Aviation Corporation, South Bend, Indiana. Principal products of the Peco concern are devices for regrooving and slotting

tires, including equipment for reproducing the various X, diamond or zig-zag patterns of tires. Under the name of Bendix-Peco Nu-Grip equipment, devices for cutting tires in a diagonal or a spiral diagonal pattern will also be offered by the new subsidiary. Tires slotted in this manner accomplish a squeegee effect on road surfaces assuring quicker stopping. The illustration shows tires cut both diagonally and spirally. (For complete details of the Nu-Grip process see the August, 1935, issue of THE RUBBER AGE).

New Factory in Uruguay

One of the most modern tire factories in the world is expected to begin production in Montevideo, Uruguay, within the next several weeks, according to Akron officials of the B. F. Goodrich Company. Known as the F.U.N.S.A., the new factory will operate under the direction of Raul Rohr, local industrial engineer, under a long term government grant. V. B. Gay, W. T. Stephans and Charles Gardner, of the Goodrich personnel, will supply technical information, train native workers, and generally supervise manufacturing processes and plant operations at Montevideo. Mr. Gardner has been at the new plant supervising machinery installation since last November, while Messrs. Gay and Stephans sailed for Uruguay on January 25, a farewell banquet being given both men by their Akron associates at Young's Hotel on January 15.

Canadian Production High

According to a report recently issued by the Dominion Bureau of Statistics, rubber manufactures in 1934 were valued at $55,230,381, the highest since the record output of $73,752,673 established in 1930. Canadian exports reach practically all far-flung ports, exports in 1934 amounting to $11,990,151. Although Canada was the fifth largest importer of raw rubber in 1930, it slipped to seventh place in 1934, both Japan and Russia heading it.

RUBBER SHOE RULING HITS FOREIGN IMPORTS

In a decision handed down on March 2, the Appellate Division of the Customs Court upheld an earlier decision by Judge McClelland, New York justice, in ruling that imported rubber-soled canvas footwear is properly dutiable on an American selling-price basis. The decision affects Japanese producers principally, requiring them to pay a 35% ad valorem duty on a value basis of 59 to 69 cents a pair, less trade discounts, on rubber-soled footwear. Under the former valuation the same percentage of duty was assessed on a foreign value ranging from 8.8 to 14 cents a pair.

When the higher valuation basis was fixed by presidential proclamation three years ago, the Japan Import Company, of New York City, filed suit in June, 1933. Besides claiming that the flexible provisions of the law are unconstitutional the importers charged that the canvas shoes imported were "not like or similar to" the footwear manufactured in this country and therefore did not fall under the flexible section.

The decision of the Appellate Court may be appealed to the United States Court of Customs and even to the Supreme Court. No such action has yet been taken.

Sears Buys Commodity Seat

In order to facilitate hedging operations against manufactured goods which it had on hand, Sears, Roebuck & Company, of Chicago, purchased a seat on the New York Commodity Exchange last month and was admitted to membership in the name of Fowler B. McConnell, assistant to the president of the company, on February 17. Dispelling rumors that the seat was purchased for any purpose other than that named by the company, General R. E. Wood, Sears president, announced that the purchase was not to be taken "as an indication of any change whatever in the company's tire buying policy."

Rubber Figures in Parade

The annual Desert Circus parade staged in Palm Springs, California, in the mardi-gras spirit, was supplemented this year by 28 large rubber novelties supplied by the Gilmore Oil Company. Of these 13 were huge, inflated, grotesque animals, the balance being large clown heads, also of the inflatable type. The rubber animals included replicas of elephants, lions, cats, etc. The parade was held on February 20.

Lee Sales Increase 14%

For the year ended October 31, 1935, the Lee Tire and Rubber Company, of Conshohocken, Pennsylvania, reports net sales of $8,451,000, an increase of 14% over the sales of the preceding fiscal years which amounted to $7,354,000. Net sales for the current fiscal year were the largest since 1930.

DR. PATRICK ADDRESSES BOSTON RUBBER GROUP

The mid-winter meeting of the Boston Group, Rubber Division, A. C. S., was held on February 18th at the University Club in Boston, with approximately 100 members and guests present. This was the first meeting presided over by the newly-elected chairman, John T. Blake, of the Simplex Wire and Cable Company.

Dr. J. C. Patrick, director of research, Thiokol Corporation, Yardville, N. J., spoke on the subject of Thiokol, and discussed various points of technical interest. He illustrated his statements with blackboard charts and graphs and was kept busy answering questions from the audience on specific points.

Following this address, a motion picture on the "Manufacture of Golf Balls" was shown through the courtesy of the U. S. Rubber Products, Inc., Providence division. G. E. Long and I. S. Black mutually prepared a paper on this subject, and the latter, foreman of the golf ball department, delivered it in conjunction with the showing of the film. Both the paper and the film were devoted to the various operations in the manufacture of golf balls.

L. A. RUBBER GROUP HOLDS MARCH MEETING

Seventy-two members and guests attended the regular monthly supper meeting of the Los Angeles Group, Rubber Division, A.C.S., on March 3, in the Dungeon Dining Room of the Los Angeles Furniture Mart.

The ten minute business historical talk this month was given by Allan G. McGrath, plant engineer for the Darnell Corporation of Long Beach. Mr. McGrath recounted the steps in the development of his company from its beginning in 1921 to its present status with 116 employes and sales offices in leading cities. The Darnell Corporation is largely engaged in the manufacture of casters. Rubber, Mr. McGrath explained, was introduced to take the place of lignum vita and used as tires for casters a number of years ago and now it is so important in the work of the company that a completely equipped rubber mill is maintained.

Charles Lamb (West American Rubber Company), classified as "The Rubberized Walter Winchell of Hollywood," gave a ten minute talk on "personals."

J. E. Phillips, assistant plant engineer for United States Rubber Products, Inc., at Los Angeles, spoke on "Mold Problems" and answered a variety of technical questions propounded on the matter of mold manufacture.

Several reels of moving pictures showing in detail the manufacture of steel from the time the iron is taken from the ground until tubular piping is ready for market were presented by four representatives of the Columbia Steel Company (subsidiary of the U. S. Steel Corporation), and a brief lecture was given on the San Francisco-Oakland bridge especially with reference to the steel used in its construction. The four men were Roy B. Southworth, engineer, and H. M. Coulter, W. Heinamen and John Eberhardt, salesmen. The talk on the big bridge was given by Mr. Southworth.

An entertainment feature was a vaudeville presentation by a Los Angeles plumber who played popular melodies on various articles of plumbing equipment, something new in the way of musical instruments.

Door prizes, given by Francis Pratt of DuPont, were won by Ned Tarkington, J. R. Gardner, and John Lockridge. The prizes were a desk set, a cigar lighter, and an Eversharp pencil, respectively. Arthur Wolff of the New Jersey Zinc Sales Company will donate the door prizes at the April meeting.

The next regular monthly meeting will be held on Tuesday, April 7, but there is prospect of a special meeting being called later this month.

Close Murray Rubber Factory

Purchased a few months ago by Max Kalter, New York City industrialist, the factory of the Murray Rubber Company, at Trenton, New Jersey, has been closed down. I. Tachna, recently named head of the new Murray concern, the Murray Rubber Products Company, has announced that a statement will be issued shortly with respect to the disposition of the factory.

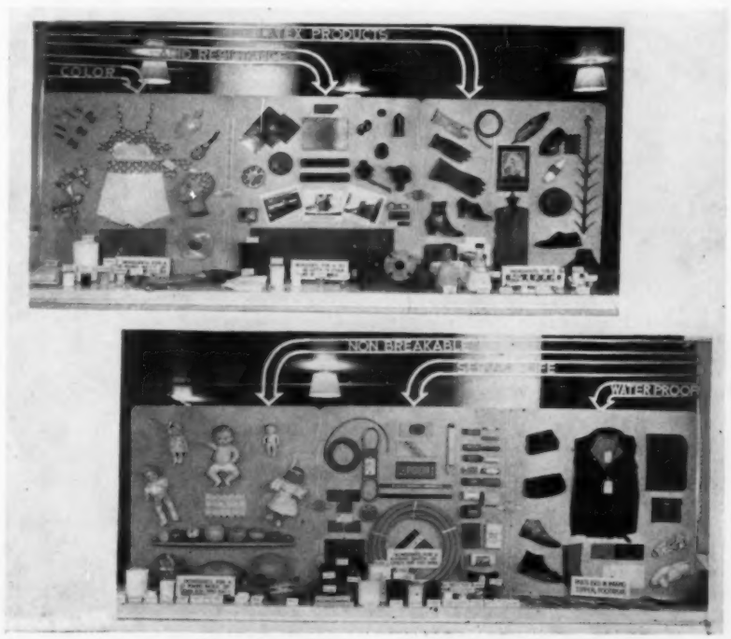
GOODRICH EXHIBITS AT SCIENCE MUSEUM

Included among the exhibits featuring the New York Museum of Science and Industry, which was formally opened to the public on February 12 at its new home in the R.C.A. Building, Rockefeller Center, in New York City, is one conducted by the B. F. Goodrich Company. The major portion of this exhibit is devoted to an outline of the part played by laboratory research in the development of rubber products for sundry purposes. A huge map depicts the widely separated parts of the nation and the world from which come the hundreds of materials which are incorporated in the finished rubber product.

A series of glass containers in which are maintained various ingredients in the exact proportions in which they go into the manufacture of various articles, including footwear, gloves, bathing caps, fountain pen sacs, etc., are on display. Eighteen different tires, each designed for a specific transportation need, are shown. The several steps in the construction of pneumatic tires, from plantation to finished product, are depicted by a photographic mural consisting of six 40 x 60 inch photographic enlargements.

Two other special exhibits are arousing much public interest. One of these is an exhibit demonstrating the progress made along the line of colored rubber goods with a number of finished products portraying colors now obtainable. The other is the recently-perfected Goodrich de-icer which prevents the formation of ice on airplane wings. Attached to a replica of an airplane wing, a push-button system enables the visitor to watch the inflating and deflating action of this device.

Oher special exhibits on view at the Museum have been arranged by General Electric, Bell Telephone Laboratories, Eastman Kodak, and the N. Y. Central Railroad.



Two panels of the Goodrich exhibit at the New York Museum of Science.

Financial News

GOODRICH 1935 NET AMOUNTS TO $3,429,781

Reporting consolidated sales of $118,669,013 for the year ended December 31, 1935, the B. F. Goodrich Company, Akron, had a net profit of $3,429,781, which compares with consolidated sales of $103,871,717 and a net profit of $2,534,679 in the previous year. The 1935 net profit was the highest since 1929, when a profit of $7,400,000 was reported on $164,000,000 total sales. Less profit on the sales of securities and non-recurring items, Goodrich earned $2,780,698 in 1935 from ordinary operations as compared with $1,533,800 in 1934.

The results of operations of the Hood Rubber Company, which became a wholly-owned subsidiary in June, 1935, are included from July 1 to December 31. Total current assets, according to the Goodrich statement, amounted to $68,259,561 at the end of the year, while current liabilities amounted to $13,609,655, a ratio of 5 to 1.

U. S. RUBBER EARNED $2,231,378 LAST YEAR

For the first time since 1927, the United States Rubber Company, and wholly-owned subsidiaries, earned a net profit last year, the net income for the twelve months ended December 31, 1935, being reported at $2,231,378 after all charges. Prior to the addition of a $500,000 dividend from U. S. Rubber Plantations, Inc., the 1935 net profit was $1,731,378. In the previous year, U. S. Rubber reported a loss of $543,608.

Net sales for the year totaled $127,793,615, after the deduction of all returns, discounts, allowances, etc., an increase of $22,316,743, or 21%, above 1934 total sales. Profit from operations prior to deduction of interest, depreciation, income tax, and other charges, amounted to $17,856,232. The following charges were provided for: interest, $3,459,784; depreciation, $5,581,878; income taxes, $1,535,959. Other charges provided for adjustments of property values, provision for contingencies, etc.

According to the statement, 12 subsidiary corporations were dissolved during the period, the company now including 56 subsidiary and affiliated corporations of which 34 are included in the consolidated balance sheet while 20 are outside the United States.

Operations of U. S. Rubber Plantations, Inc., resulted in a profit of $967,695 for the year after providing for depreciation and amortization of $1,664,093, as compared with a profit of $1,735,842 for 1934. A dividend of $500,000 was declared, leaving the $467,695 balance as a credit to surplus. Assets, liabilities and earnings of the plantations company are carried as a separate item on the consolidated balance sheet and are not consolidated with other earnings and operations. Production of U. S. Rubber Plantations for the year was 42,054,000 pounds which was in excess of 2,050,000 pounds of permissible exports under the restriction cartel. Approximately 99,000 acres are planted and 90,000 have reached maturity. Average yield per acre is 559 pounds.

The annual report points out that taxes during 1935 reached $10,105,000, exclusive of "invisible" taxes included in the cost of materials and wages, which would be equivalent to $3.34 a share on the common stock. Mention of taxes to be paid under the social security legislation during the current and subsequent years, is also made.

AETNA RUBBER CO. REDUCES 1934 LOSSES

For the year ended December 31, 1935, the Aetna Rubber Company, Ashtabula, Ohio, reported a net loss of $81,727 which compares with a net loss of $107,880 reported in 1934. Prior to extraordinary and non-recurring expenses and depreciation, Aetna ended the year with a net loss of $7,295.

Current assets amounted to $144,172 against current liabilities of $57,185. Net working capital was $86,987 as compared with $91,201 in the preceding year. Surplus accounts show a net deficit of $58,075, while unpaid and undeclared dividends amount to $25,725.

Profit for United Carbon

Earnings of the United Carbon Company, Charleston, West Virginia, and subsidiaries, for the year of 1935 were the largest in the company's history. Net profit, after depreciation, provision for Federal taxes, etc., amounted to $1,872,405, equal to $4.70 a share on 397,885 shares of no-par common stock. Net profit for 1934 amounted to $1,452,939, or $3.55 per share. The following reserves were deducted: Federal and state income taxes, $278,900; contingencies, $185,000; and depreciation and depletion, $1,079,971.

N. J. Zinc Increases Income

For the year of 1935, net income of the New Jersey Zinc Company, New York City, amounted to $4,666,000 after taxes, depreciation, contingencies, etc., equal to $2.37 a share on 1,963,264 shares of $25 par value. In the previous year the company earned $3,788,380, or $1.93 per share. Net income for the final quarter of 1935 amounted to $1,323,784 after all deductions, equivalent to 67 cents a share.

GOODYEAR 1935 INCOME EXCEEDS THAT OF 1934

Net profit of the Goodyear Tire & Rubber Company, Akron, for the year ended December 31, 1935, amounted to $5,452,240, exceeding by $898,000 the net profit of $4,553,964 (which included $266,279 profit on book values of foreign net current assets previously written down by charges to profit and loss) reported in the previous year.

After dividend requirements on the $7 preferred stock, on which there is an accumulation of unpaid dividends, 1935 earnings were equal to 18 cents on each of the 1,540,542 no-par shares of outstanding common stock. The 1934 net profit was equal to $6.04 each on 753,760 shares of the $7 first preferred stock.

Consolidated net sales for the year were $164,863,974, an increase of 20% over the 1934 net sales of $136,800,764. Before interest charges but after providing $8,289,783 for depreciation of factories, machinery and equipment, and $16,988,624 for taxes and duties of all kinds, consolidated earnings amounted to $8,897,310. Net consolidated book valuation of the company's properties and factories all over the world is listed at $77,554,547, or 47% of the total original cost.

Cash and government securities on hand amounted to $25,987,223. Total current assets are shown as $106,508,461 against current liabilities of $8,052,073, a ratio of 13 to 1 as compared with a ratio of 11.7 to 1 in 1934. A reduction in charges prior to common stock was effected at mid-year, according to the report, through the issuance of $6,000,000 par amount 5% cumulative preferred stock and the retirement of $7,187,500 par amount of 7% cumulative preferred stock of the Goodyear Tire & Rubber Company of Canada, Ltd.

The assets and liabilities of the Kelly-Springfield Tire Company, acquired by Goodyear in August of 1935, were consolidated in the current financial statement, the difference between the purchase price (cash and Goodyear common stock) and the fair value of the net current assets being set up as a reserve. The operating results since acquisition of Kelly-Springfield in August have been charged to this reserve so that no gain or loss is reflected in the consolidated earnings statement.

Loss for California Goodyear

For the year of 1935, the Goodyear Tire and Rubber Company of California, Los Angeles, and wholly-owned subsidiaries, report a net loss of $44,358 after depreciation, taxes and other charges, comparable with a net profit of $130,746 in the previous year which was equal to $1.65 a share on 79,116 shares of $100-par, 7% cumulative preferred stock on which there is an accumulation of unpaid dividends. The entire common stock of California Goodyear is owned by the parent company.

GOODYEAR OF CANADA INCREASES EARNINGS

For the year ended December 31, 1935, Goodyear Tire & Rubber Company of Canada, Ltd., New Toronto, Ontario, and subsidiaries, report a net profit of $1,445,198, an increase of $16,362 over the $1,428,835 reported for the previous period. Before setting aside a reserve of $579,906 for depreciation, operating profit amounted to $2,025,105.

After deducting preferred dividends, a balance of $1,061,605 was applicable to the common stock equivalent to $4.12 a share on 257,260 shares of new common stock outstanding, or $8.25 a share on the former 128,630 shares of stock in comparison with $7.19 a share in the previous year.

Current assets, including $664,379 in cash and $2,975,166 in call loans and government securities, are listed at $8,913,597, against current liabilities of $429,769. The total of cash, call loans and government securities is equivalent to 8.47 times the total current liabilities. Goodyear of Canada has no bank indebtedness.

Total working capital of $8,483,827, reported at the end of December 31, 1935, represents a decrease of $1,299,671 from comparative figures at the end of 1934 and is largely accounted for by the fact that 7% preferred stock to the par value of $7,187,500 was redeemed during the year and only $6,000,000 of the new 5% preferred stock issued.

Profit for Dayton Rubber

For the fiscal year ended October 31, 1935, the Dayton Rubber Manufacturing Company, Dayton, Ohio, earned $29,565, after all charges. The report lists current assets of $1,824,713 against current liabilities of $988,767, a 2 to 1 ratio. In a statement accompanying the report, John A. MacMillan, president, disclosed details of the acquisition of the McClaren Rubber Company last August. In addition to securing good will, molds and a small sales organization, Dayton Rubber also sold McClaren's tire inventory and collected most of its outstanding accounts for a cash consideration. Through the transaction, according to MacMillan, approximately $1,750,000 in possible business was secured. For the first two months of the current fiscal year, Dayton tire sales were 89% over the corresponding period last year, with mechanical goods sales 57% higher.

Baldwin Rubber Has Profit

Baldwin Rubber Company, Pontiac, Michigan, reports net income for 1935 of $434,050, after expenses, Federal taxes and other charges, equal to $6.23 a share on 69,654 shares of Class A stock, after giving effect to complete conversion of old Class A and Class B stock. In 1934, Baldwin reported a net income of $69,427, or $1.00 per Class A share. Directors of the company approved a four-for-one split-up of the outstanding shares of capital stock on February 21.

St. Joseph Reverses Loss

A net profit of $486,200 for the year of 1935 was reported by the St. Joseph Lead Company, New York City, which compares with a net loss of $812,534 reported for 1934. The difference between the two figures, according to the report, was due primarily to a change in the method of computing depletion. Gross sales for 1935, including royalty earnings of $18,964, amounted to $15,286,698, compared with gross sales of $14,333,442 in the previous year.

Raybestos-Manhattan Gains

Raybestos-Manhattan, Inc., Passaic, N. J., earned a net income of $1,374,423 in 1935, equal to $2.16 per share, which compares with net income of $750,891, or $1.17 per share, in the previous year. Total assets amounted to $17,406,231, including current assets of $8,403,046. Directors also declared a quarterly dividend on February 19 of 37½ cents a share payable on March 14 to stockholders of record on February 28, 1936.

Smaller Auto Rim Trend

That automobile manufacturers are tending to use smaller rim diameters, and that the range of tire cross sections for passenger cars is becoming smaller, is revealed by the original tire equipment specification lists for the 1936 models just made available by the B. F. Goodrich Company, Akron. Because of this tendency, the number of original equipment sizes is less than those in recent years.

GOODALL ABSORBS READING RUBBER CO.

Effective February 1, the Goodall Sanford Industries absorbed the patents, trade-marks and good will of the Reading Rubber Manufacturing Company, of Reading, Mass., and will continue operation of the company as a wholly owned subsidiary. The rubber company's property adjoins the Sanford Mills and the two will be operated as one unit, specializing in rubberized and lacquer finished fabrics for the automotive, railroad, and interior furnishing field.

According to Goodall Sanford Industries, all of the Reading machinery and equipment will be modernized in the immediate future. The sale of Reading products will be handled by L. C. Chase & Company, the selling division of Goodall Sanford, as heretofore.

Scrap Institute to Meet

The Scrap Rubber Institute of the National Association of Waste Material Dealers, Inc., will hold a meeting on Tuesday, March 17, at 2 P. M., in the Hotel Astor, New York City, in conjunction with the Twenty-third Annual Convention of the Association, which is being held at the Astor, March 16, 17 and 18.

Lee Adds Coast Outlets

Lee Tire & Rubber Company, Conshohocken, Penna., recently closed a contract with the Signal Oil Company for the distribution of Lee tires and accessories on the West Coast. The Signal concern has approximately 2,000 retail outlets located in the states of California, Oregon, Washington, Idaho, Nevada, Utah and Arizona.

DOMINION RUBBER AWARDED SAFETY PLAQUE

The "Excellence" award of the Quebec Association for the Prevention of Industrial Accidents for 1935 was awarded to the Dominion Rubber Company, Ltd., Montreal, Canada, last month, for operating 1,148,400 man hours during the year without a lost-time accident. The photograph shows Mr. W. A. Eden, president of the Dominion Rubber Company (at the right), receiving the plaque from Lieut. Col. Arthur Gaboury, of the Quebec Association for the Prevention of Industrial Accidents.

Names in the News

G. B. WYATT, formerly connected with Barr Rubber, and more recently with the Paragon Rubber Company, Inc., of Brooklyn, New York, has joined the Admiar Rubber Company, also of Brooklyn, in charge of the laboratories. Admiar manufactures rubber dolls and toys and may shortly add a mechanical rubber goods line.

A. G. PARTRIDGE was named president of the Goodyear Tire & Rubber Company of Canada, Ltd., Toronto, last month, succeeding C. H. CARLISLE who became chairman of the executive and finance committee. P. A. THOMSON succeeds Mr. PARTRIDGE as vice-president.

LEONARD P. TUFFORD, president, I. T. S. Rubber Company, Elyria, Ohio, was also named general manager recently taking over the duties of C. H. INGWER who was vice president and general manager.

F. D. GILLEN, manager, sales department, General Tire & Rubber Company, Akron, was elected president of the Akron Generator Club last month.

V. L. SMITHERS, president, V. L. Smithers, Inc., Akron, won a suit in the Supreme Court at Columbus (Ohio) for a set-off of a $1,223 note against a $2,318 deposit in the old First-Central Trust Company, recently.

CARL H. HELDENBRAND, Goodrich mechanical engineer, was granted a patent on February 6 by the U. S. Patent Office covering the latex-impregnated hair cloth known as NuKraft, which is already being merchandised by Goodrich.

STEPHEN S. MILLER, chairman of the board, Mohawk Rubber Company, Akron, one of the rubber industry's pioneers, celebrated his 80th birthday on February 7. He is still active in the affairs of Mohawk.

JOHN C. GIBSON, president, Pioneer Rubber Company, Sandusky, Ohio, delivered an address on February 10 before members of the North Central Ohio Draft Horse Association.

ROBERT D. SPENCER, formerly assistant city engineer of Norwood (Ohio), has joined Firestone and recently sailed for Liberia where he will be stationed for the next two years on the Firestone plantations.

MARTIN CASTRICUM, engineer, Textile Section, Product Development Division, U. S. Rubber Products Company, Detroit, has been appointed a member of the Detroit District Committee of the American Society for Testing Materials.

ROBERT S. WILSON, vice-president and sales manager, Goodyear Tire & Rubber Company, Akron, has been named a member of the Western Reserve Academy board of trustees.

R. M. WEINER and URBAN MOLER, personnel directors, respectively, of the Dayton Rubber Manufacturing Company and the Inland Manufacturing Company, both of Dayton, Ohio, have been named members of the program committee for the All-Ohio Safety Congress to be held in Columbus on June 2, 3 and 4 at the Deshler-Wallick Hotel.

DR. J. W. SCHADE, director of research, B. F. Goodrich Company, Akron, discussed the technical developments in the rubber industry before the Cleveland Section of the A.C.S. on February 14.

WILLIAM R. CISNEY, associated with A. Schrader's Son for over thirteen years, has been appointed assistant sales manager, succeeding Marcel H. Tisney, retired.

E. V. PETERS, vice-president, St. Joseph Lead Company, New York City, was elected a trustee of the company at a meeting of the board on February 20.

CY S. CHING, director, industrial and public relations, U. S. Rubber Products, Inc., New York City, was chairman of a session devoted to "Safety Training" during the Seventh Annual Greater New York Safety Conference held in New York City on March 3, 4 and 5.

FRANKLIN FARREL, JR., and NELSON W. PICKERING, were respectively re-elected chairman of the board and president of the Farrel-Birmingham Company, Inc., Ansonia, Conn., at the annual meeting of stockholders on February 20.

SAMUEL B. ELLIS, export department, Goodyear Tire & Rubber Company, Akron, recently returned from China, spoke on Chinese affairs to members of the Akron Y.W.C.A. on February 10.

EDWARD B. FRIEDLANDER, president of the Loewenthal Company, Chicago, scrap rubber dealers, has been re-nominated for president of the National Association of Waste Material Dealers, Inc.

HARVEY S. FIRESTONE, SR., chairman of the board, Firestone Tire & Rubber Company, Akron, was named a member of the Thomas A. Edison Foundation campaign committee on February 21.

Named Research Director

W. B. Wiegand has been named director of research for the Columbian Carbon Company. Since 1925 he has been associated with the Binney & Smith Company and during this time has directed the study of some of the basic properties of carbon black. In the past few years the research division of Binney & Smith has been largely concerned with improvements in the application of rubber and high grade carbon blacks. The rounding off of this problem in so far as fundamental studies are concerned now makes possible a more intensive study of production problems. Although concentrating on production research from now on, Mr. Wiegand will maintain close contact with the Binney & Smith Company.

Preparing New Goodyear Book

Hugh Allen, public relations manager of the Goodyear Tire and Rubber Company, Akron, is preparing for early publication a new book to be termed "The House of Goodyear." It will deal with industrial problems of price movements, marketing and economic conditions effecting the company. Mr. Allen is author of "The Story of the Airship."

Cecil Adamson in Control

Controlling interest of the Adamson Machine Company, of Akron, is in the hands of Mr. Cecil Adamson. In our preceding issue we stated, due to a typographical error, that "Cecil Dawson" held such interest. The Adamson plant is actively engaged in filling several orders for rubber machinery.

GODFREY L. CABOT, president, Godfrey L. Cabot, Inc., Boston, donated $144,000 to the cause of aeronautics recently. He has been a constant contributor to this cause for many years and seeks "the same service for the United States to the navigation of the illimitable air that England has rendered to the navigation of the salt seas."

T. J. STARKIE, vice-president, Wishnick-Tumpeer, Inc., returned recently from a long winter vacation trip to California.

G. L. SMITH, associated with the Republic Rubber Company, Youngstown, Ohio, for thirteen years, has been appointed assistant sales manager.

THOMAS S. GRASSELLI, president, Grasselli Chemical Company, has been elected a vice-president of E. I. du Pont de Nemours & Company, and has also been appointed a member of its executive committee.

PAUL W. LITCHFIELD, president, Goodyear Tire & Rubber Company, was one of eighteen business leaders named as members of Secretary ROPER's business advisory council last month.

CRUDE CONSUMPTION HIGHER IN JANUARY

Consumption of crude rubber by manufacturers in the United States for the month of January, 1936, is estimated to be 48,506 long tons, which compares with 42,942 long tons for December, 1935. January, 1936, consumption shows an increase of approximately 13% above December, 1935, and 3% above January a year ago, according to statistics released by the Rubber Manufacturers Association. Consumption for January, 1935, was reported to be 47,103 long tons.

Imports of crude rubber for January, 1936, were reported to be 31,292 long tons, a decrease of 9.6% below the December, 1935, figure of 34,596 long tons, and 25.6% under 42,059 long tons imported in January, 1935.

Total domestic stocks of crude rubber on hand January 31, 1936, are estimated at 276,372 long tons, which compares with December 31, 1935, stocks of 295,438 long tons and 348,931 (revised) long tons on hand January 31, 1935.

Crude rubber afloat to U. S. ports as of January 31, 1936, is estimated to be 43,870 long tons as compared with 39,094 long tons afloat on December 31, 1935, and 42,066 long tons afloat on January 31st a year ago.

January reclaimed rubber consumption is estimated at 10,039 long tons; production, 11,665 long tons; and stocks on hand, January 31, 1936, 26,145 long tons.

DECEMBER SHIPMENTS 4.1% ABOVE NOVEMBER

Shipments of pneumatic casings during the month of December, 1935, are estimated to be 4,153,807 units, an increase of 4.1% above November, 1935, and 33.6% over shipments made in December, 1934, according to statistics released by the Rubber Manufacturers Association.

Production of pneumatic casings for December, 1935, is estimated to be 4,051,286 casings, an increase of 1.4% over November, 1935, and 7.2% above December, 1934.

Pneumatic casings in the hands of manufacturers, December 31, 1935, are estimated to be 8,195,863, a decrease of .6% under the stocks on hand November 30, 1935, and 13.3% below stocks on hand December 31, 1934.

The actual figures are as follows:

PNEUMATIC CASINGS

	Shipments	*Production*	*Inventory*
Dec., 1935	4,153,807	4,051,286	8,195,863
Nov., 1935	3,989,877	3,997,025	8,249,220
Dec., 1934	3,108,552	3,778,418	9,454,985

Safety Tire Factory Burns

The two-story brick factory occupied by the Safety Tire and Rubber Company, at 29-16 Fortieth Avenue, in Long Island City, New York, was ruined by a fire of undetermined origin on February 25. Damage was estimated at $100,000 by the company which retreads tires. The burning rubber with its resultant stench and smoke made it difficult to bring under control.

Change Rubber Service Name

In keeping with a program of the parent company to simplify its capital structure, the Rubber Service Laboratories Company, of Akron, will henceforth become a division of the Monsanto Chemical Company rather than a wholly owned subsidiary. In the future, operations of the company will be conducted under the name, the Rubber Service Laboratories Division, Monsanto Chemical Company, Akron, Ohio. No change in the management, operation or personnel of Rubber Service is involved.

Aetna Shifts to Cleveland

The factory of the Aetna Rubber Company, at Ashtabula, Ohio, was closed early last month preparatory to moving machinery and equipment back to Cleveland where the company was formerly located. Several departments of the company have already been shifted to the Cleveland headquarters over a period of months. According to Aetna officials, the move was made necessary by repeated strikes at the Ashtabula plant which tied up production and prohibited prompt shipment of orders.

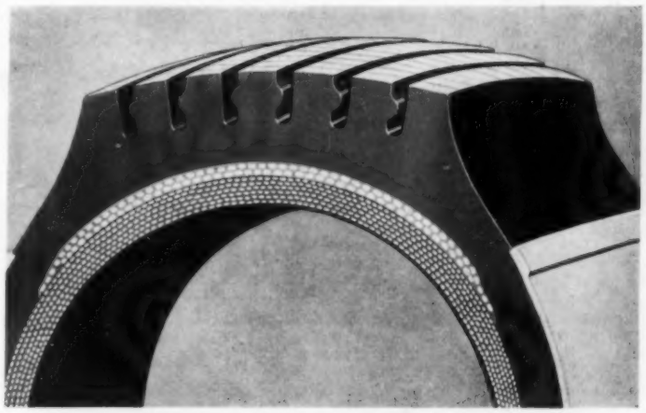
HIGHER RUBBER QUOTA REFUSED TO CEYLON

Although not officially confirmed, it is understood that the International Rubber Regulation Committee has decided against increasing the basic quota for Ceylon which was specifically requested by that country. It is believed that while the increase granted the Netherlands East Indies was essential to the survival of the restriction scheme, a similar grant to Ceylon would set a precedent that would seriously interfere with operation of the plan.

Exports from Ceylon in 1935 amounted to 54,326 tons, according to the Leather and Rubber Division of the Bureau of Foreign and Domestic Commerce, which was 1.84% in excess of the permissible exports, but well within the 5% allowable excess.

There is a fair possibility that Ceylon may withdraw from participation unless its demands for an increased quota are partially satisfied. The Minister of Agriculture and Lands in a recent speech before the Ceylon State Council stated that "the position is a serious one . . . I do not know whether it is worthwhile for Ceylon to continue in the scheme at all." According to a report from American Consul Buell, thousands of workmen are out of employment in Ceylon owing to the restriction scheme and many estates have been closed down entirely or are operating at one-quarter to one-half capacity.

CENTIPEDE GRIP FEATURES NEW U. S. TIRE



Groove design and tread depth of the new U. S. Royal Master

Featuring an anti-skid principle based on the use of narrow, flexible ribs which are de-skidded, U. S. Rubber Products, Inc., New York City, has announced a new tire termed the U. S. Royal Master with Centipede Grip.

To secure the de-skidded tread, termed the Centipede Grip, there are 1,000 cross edges in the tread of the tire, which is accomplished, according to the company, without altering its straight line design, without removing any of its extra tread rubber, and without affecting its riding qualities.

De-skidding is said to make the tread more flexible and permits it to conform to road irregularities under conditions where conventional tread designs are scuffed or abraded. It is also said to give the tires longer life.

Another feature of the new Royal Master is a design for preventing the tire from picking up and retaining stones on gravel roads. Grooves of special shape prevent the entrance of stones of a size which would normally be retained. This feature permits the use of deep, narrow grooves.

NEW ENGLAND NEWS

Sydney Blumenthal, Inc., textile concern operating the Shelton Looms in Shelton, Conn., has been named defendant in a U. S. District Court action filed by the United States Rubber Products, Inc., in which infringement of patents is claimed. The rubber company asks temporary and permanent injunctions and an accounting of profits and damages.

The plaintiff claims that for more than six years the Blumenthal company has been wrongfully using patented processes for treating and rubberizing fibrous materials, vulcanizing rubber and producing tufted sheet work, and that repeated warnings have been disregarded. Judge Carroll C. Hincks of the Federal court in New Haven will conduct a hearing on the restrainer petition in April.

A triple coverage group insurance program, providing for more than 880 employes, with a total of approximately $745,000 life insurance, has been adopted by the Converse Rubber Company, of Malden, Mass. The group policy covers accidental death, indemnity for accidental loss of eyes or limbs, and weekly benefits for sickness and non-occupational accidents. It is being administered by the Metropolitan Life Insurance Company.

Russell Mfg. Company, Middletown, Conn., has been operating some departments on three shifts, employing about 1,000 hands as against 650 six months ago. Most of the increase is due to stepped-up production schedules on the company's automotive products.

An addition is being built at the plant of R. T. Vanderbilt, Inc., Winfield street, East Norwalk, Conn., which will increase laboratory and production facilities.

Property of the United States Rubber Company in Naugatuck, Conn., is being assessed at $3,949,340 on the 1936 Naugatuck grand list. The company operates two large plants in the borough, U. S. Rubber Products, Inc., and the Naugatuck Chemical Co.

Directors of Raybestos-Manhattan, Inc., Bridgeport, Conn., have voted an increase in the quarterly dividend of 12½ cents a share for the quarter ending February 29. The payment will be at the rate of 27½ cents as compared with 25 cents paid previously. The company earned $1,374,423.34 in 1935, equivalent to $2.16 per share, comparing with net income of $750,819, or $1.17 per share, during the previous years.

Officers of the Alling Rubber Company, operating a large chain of rubber goods stores in the Northeast have been re-elected for 1936. J. M. Bailey is president, treasurer and general manager; Walter A. Decker, vice-president; Merwin S. Bronson, secretary, and Earl E. Edwards, director. Managers of Connecticut and Massachusetts stores held a luncheon meeting February 17 at the City Club, Hartford.

MacMillan Returns to Dayton

John A. MacMillan, president of the Dayton Rubber Manufacturing Company, returned last month from a three month business tour which took him into several marketing centers of Central and South America. Reporting several definite indications of business recovery, Mr. MacMillan stated that "there is little likelihood of any sustained dips in the business chart during the coming year . . . any slack periods are likely to be of short duration." Referring to conditions at the Dayton factory, he said "we now have five divisions in our own company. Two of them, tires and tubes, and fan belts, serve the automotive market. Our industrial belts are used on all types of machine tools. Our connector and endless cog belts serve the railroads for their air conditioning and lighting equipment. Dayco printers' rollers are used on every type of press. With such a diversified line of products being sold to our greatest markets we are able to feel the pulse of the business world."

Henrite Products Expanding

The Henrite Products Corporation, of Ironton, Ohio, has embarked on an expansion program which includes the construction of a new storage building and restoration of its factory to its original manufacturing capacity. The new section of the plant will be devoted to the production of rubber and metal motor mounting assemblies, a large mill already having been installed for early use. Frank L. Shew, formerly with the Aetna Rubber Company, was recently appointed chief chemist.

Raise Export Duty Again

Continuing its efforts to prevent excess shipments from native quarters, the government of the Netherlands East Indies has raised the export duty on native rubber to 32 guilders per 100 kilograms (a guilder is worth approximately 68 cents at current rate of exchange). This is the first increase since last November and represents a tax of approximately 8 cents per pound.

U. S. CONSUMED HALF OF 1935 RUBBER TOTAL

Rubber consumption in the United States for the year of 1935 amounted to 497,150 tons or 53% of total world consumption which totaled 937,777 tons, according to figures published in the weekly survey issued by the Commodity Exchange, Inc. This is the first time since 1932 that the proportion of U. S. consumption has reached over 50% of world absorption.

Since 1926, United States consumption has shown a net increase of 36.1%, but the proportion in the world total decreased from 67% in 1926 to 48.4% in 1932. The years of 1933 and 1934 ended with still lower proportionate averages. Increased consumption on the part of Japan, which has rapidly earned a place among the leaders of rubber absorption, was principally responsible for the decreased percentages in U. S. consumption. Total world shipments in 1935 amounted to 875,808 tons.

New Synthetic Rubber Plant

The construction of Germany's first factory for the exclusive manufacture of synthetic rubber has been started in Piesteritz b. Wittenberg. According to report the factory will probably be in operation early in 1936.

LOS ANGELES NEWS

The regular monthly supper meeting of the California Rubber Manufacturers' Association was held on February 20 at the Cafe de Paree, in Los Angeles. Charles N. Merralls, president, reports that the meeting was wholly social and that efforts are being put forth to secure a specially large attendance at the March meeting to be held on the third Thursday of the month (March 19) at a location not yet selected.

G. G. Balazs, chairman, Los Angeles group, Rubber Division, A. C. S., who underwent an operation for appendicitis late in January, is fully recovered and is now back on his job as research chemist at the Goodyear plant.

Charles N. Merralls, president of Rubbercraft Corporation of California, reports the introduction by his company of a rubber mat for milk bottles. The specific use for the mat is in apartment houses and is designed to prevent milk bottles from staining the floor when left by the milkman. The mat is molded with cupped indentations exactly fitting the bottoms of standard sized milk bottles—half pints, pints, and quarts.

Another item recently turned out in some quantity by this company is a hard rubber airplane model with a two-foot wing spread to be used for air transport publicity purposes at ticket offices and terminals.

New Rubber Goods

Rubber Tobacco Dispenser

An innovation for the pipe smoker has appeared in the form of a rubber pouch and tobacco dispenser, a product of the Pres-to-Fill Products Company, 300 West Adams Street, Chicago, Illinois.

Practical, light, attractive and convenient, the dispenser is molded of rubber, finished to resemble grain leather. Holding two ounces of tobacco, pipes are filled directly from the dispenser by pressing the sides, the tobacco flowing into the bowl of the pipe through an opening at the bottom. An airtight feature assures retention of the freshness of the tobacco. It is available in black or brown.

Rubber-Bladed Electric Fan

Said to be the first major improvement in electric fans since their inception fifty years ago, the Samson-United Corporation, Rochester, N. Y., has introduced a fan equipped with blades made of molded rubber. Though rigid enough to deliver a steady current of air strongly, the blades are claimed to be sufficiently soft and flexible to prevent injury to fingers and hands caught between them. All protective guards have been eliminated in this new fan which is noiseless in operation. The Standard model is equipped with walnut brown rubber blades with walnut brown rubber cord and plug, while two deluxe models are available in pastel green with green rubber blades or in ivory with ivory rubber blades.

Toyco Dog Head Balloon

One of the latest balloon novelties is the Toyco dog head balloon featured by the Toycraft Rubber Company, of Ashland, Ohio. A Tip-Tex novelty, it is equipped with inflatable ears, the entire balloon inflating to an 8-inch diameter. Intended for resale, advertising or premium use, the new novelty is packed one gross to the box and is available in red, blue, orange and yellow.

Tucker "Fish-N-Float"

A device which permits fishermen to float in deep water with arms and legs free for propelling, is being featured by the Tucker Duck and Rubber Company, Forth Smith, Arkansas. Circular in design, the device, known as the "Fish-N-Float," holds a regular 6.00 x 16 inch inner tube and is furnished complete with the tube permanently installed or with a zipper all around the cover so that the tube may be readily removed, replaced or repaired. The cover is of heavy, olive drab canvas. The entire float weighs only four pounds and will float a man of normal size when inflated. Straps are attached to the float for transportation purposes. To aid propelling, special paddles are available to be attached to the feet.

Seiberling's Donald Duck

The latest addition to the line of Walt Disney rubber characters produced by the Seiberling Latex Products Company, Barberton, Ohio, is the well-publicized Donald Duck. Introduced in time for the Easter trade, the new novelty has been made available in both molded and inflatable forms. As in other Disney reproductions, the molded Donald Duck novelty is completely decorated in non-poisonous, crack-proof colors. A ball joint permits movement of the head. The inflatable model is decorated in yellow and blue on a white body of rubber, and is approximately 11½ inches in height when inflated.

Inflated

Molded

Goodyear Tractor Type Tire

Said to provide greater traction under all conditions than heretofore provided by similar tires, Goodyear Tire & Rubber Company, Akron, Ohio, has announced a new all-traction type tire. The new model provides traction both forward and backward. The tread is 15% wider, and has long lug-bars for contact purposes, and the hollow "diamonds" in the center of the tread are 67% higher. Draw bar pull has been increased on an average of 30%, according to Goodyear, as a result of greater ground contact. The all-traction tractor type tire has approximately 48% more rubber in the tread and body.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, MARCH 9, 1936

Crude Rubber

CONTINUATION of favorable statistical reports (world stocks were again reduced in January) plus a persistent consumer demand last month resulted in the highest quotations for spot rubber on the Exchange in almost two years. The strike at Goodyear, now in its twentieth day, which led to rumors of a possible "showdown" between rubber manufacturers and the rubber union, caused a marked falling off in crude rubber futures, but barely affected spot prices. Despite the fears and uncertainty caused by the strike, a price of 15.93 for spot was quoted on the Exchange on March 6, the lowest quotation for the period covered being 15.44 on February 19. There is still some bullish sentiment on the market with some rubber manufacturers reported to be awaiting a bearish development so they can replenish stock. Quotations in the outside market, Exchange, London and Singapore, follow:

As of March 9

Plantations—

Ribbed Smoked Sheets—			
No. 1 Spot	—	@	.15¼
April-June	—	@	.16¼
July-September	—	@	.16⅜
No. 2	—	@	.15¼
No. 3	—	@	.15⅛
No. 4	—	@	.15⅜
Thin Latex Crepe	—	@	.16¼
Thick Latex Crepe	—	@	.16⅛
Brown Crepe, No. 1	—	@	.15¾
Brown Crepe, No. 2	—	@	.15⅛
Amber Crepe, No. 2	—	@	.15¾
Amber Crepe, No. 3	—	@	.15⅛
Amber Crepe, No. 4	—	@	.15⅝
Brown Crepe, Rolled	—	@	.15⅞

Latex—

Liquid Latex, per gal.	.59	@	.60

Paras—

Up-River, fine	—	@	.16¾
Acre Bolivian, fine	—	@	.16½

Balata—

Block, Ciudad	—	@	.32

LONDON MARKET

Standard Smoked Sheets—Buyers—March 9			
March	—	@	7 5/8d
April-June	—	@	7 1/2d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—March 9			
March	—	@	7 9/16d
April-June	—	@	7 3/8d

Reclaimed Rubber

Conditions are reported to be fair by reclaimers with all eyes centered on the war complications now current in Europe. Some reclaims, such as black tire, are now selling at one-third of crude prices which are still rising. Prices remain unchanged since our last report despite some increases in scrap.

High Tensile

Super-reclaim, black	lb.	.08¾	@	.09
High Tensile Red	lb.	.07	@	.07¼

Shoe

Unwashed	lb.	.06½	@	.06¾
Washed	lb.	.08	@	.09

Tube

No. 1 (Floating)	lb.	.14	@	.14¼
No. 2 (Compounded)	lb.	.07	@	.07¼
Red tube	lb.	.06½	@	.07¼

Tires

Black	lb.	.05	@	.05¼
Black, selected tires	lb.	.05¼	@	.05½
Dark Gray	lb.	.06¼	@	.06½
White	lb.	.09¼	@	.09½
Truck, Heavy Gravity	lb.	.05½	@	.06
Truck, Light Gravity	lb.	.06	@	.06¼

Miscellaneous

Mechanical blends	lb.	.03½	@	.04½

Scrap Rubber

Due to continued poor weather conditions the collection of scrap is slow with a resulting increase in several grades including auto tire peelings, mixed auto and boots and shoes. Prices on red inner tubes have also increased slightly. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton 19.00	@	21.00
Mixed auto	ton 8.50	@	10.00
Clean solid truck tires	ton 34.00	@	36.00
Boot and shoes	ton 22.50	@	25.00
Arctics, untrimmed	ton 17.50	@	19.00
Inner tubes, No. 1	lb. .08¼	@	.08¾
Inner tubes, No. 2	lb. .03¾	@	.04
Inner tubes, Red	lb. .03¼	@	.03⅞

Cotton

Despite the fact that the Government pool is selling in an orderly manner, the knowledge that there are such huge stocks in the hands of the Government controlled bureaus, plus a few other factors, has caused continued uncertainty in the cotton trade with the result that cotton prices dropped slowly since our last report showing a slight upward reaction in the past few days. Since February 10 prices have swung in a 60 point range, high for the month being 11.80 quoted on February 11 and 14, low being 11.20 quoted on March 4. The passage of new farm legislation in mid-February had practically no effect on speculative sentiment which was contrary to expectations. Reports indicate a cotton acreage of 32,115,000 acres in 1936 against 27,872,000 acres last year. World consumption continues to improve, but shipments are somewhat retarded because of local uncertainties. Quotations for middling uplands on the New York Cotton Exchange follow:

	February 10	March 9		
	Close	High	Low	Close
March	11.26	11.34	11.26	11.27
May	10.85	10.93	10.82	10.83
July	....	10.63	10.49	10.52

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb. .29	@	.29½
Peeler, carded, 23/4/3	lb. .30	@	.30½
Peeler, carded, 15/3/3	lb. .27	@	.27½
Peeler, carded, 13/3/3	lb. .26	@	.26½
Egyptian, carded, 23/5/3	lb. .42½	@	.43
Egyptian, combed, 23/5/3	lb. .47½	@	.48
CHAFERS			
Carded, American, 1 1/16"	lb. .29	@	.29½
Carded, American, 1"	lb. .27	@	.30½
LENO BREAKER			
Carded, American, 1 1/16"	lb. .30	@	.30½
Carded, American, 1"	lb. .28	@	.28½

Sheetings

Count	Width	Weight		
48x40	36 in.	5.50 lb.	—	@ .04⅛
40x40	36 in.	6.15 lb.	—	@ .04¼
40x36	36 in.	6.50 lb.	—	@ .04¼
48x48	40 in.	2.50 lb.	—	@ .09
48x48	40 in.	2.85 lb.	—	@ .08
56x60	40 in.	3.60 lb.	—	@ .07¾
48x44	40 in.	3.75 lb.	—	@ .06½
44x40	40 in.	4.25 lb.	—	@ .06

Ducks

Enameling	lb.	.29	@	.29½
Belting and Hose	lb.	.26½	@	—
Single filling, A grade	lb.	.13½	@	.14½
Double filling	lb.	.14½	@	.15

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM FEBRUARY 11 TO MARCH 9

Date	Spot	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Sales
Feb. 11	15.50	15.46	15.52	15.58	15.64	15.67	15.70	15.75	15.80	15.86	15.93	16.00	16.06		251
12															
13	15.63	15.57	15.63	15.68	15.74	15.80	15.87	15.91	15.95	16.01	16.07	16.14	16.20		361
14	15.69	15.64	15.70	15.75	15.80	15.86	15.92	15.97	16.03	16.08	16.13	16.19	16.25		246
15	15.75	15.66	15.72	15.79	15.86	15.91	15.96	16.00	16.05	16.11	16.18	16.25	16.31		60
16															
17	15.56	15.55	15.60	15.65	15.70	15.77	15.84	15.88	15.93	15.99	16.06	16.13	16.19		197
18	15.46	15.40	15.45	15.51	15.57	15.62	15.67	15.72	15.78	15.82	15.87	15.92	15.98		425
19	15.44	15.38	15.43	15.48	15.54	15.60	15.66	15.70	15.75	15.81	15.88	15.95	16.00		432
20	15.56	15.50	15.55	15.62	15.70	15.73	15.77	15.82	16.88	15.94	16.00	16.06	16.11		127
21	15.68	15.63	15.68	15.74	15.81	15.85	15.90	15.94	15.99	16.05	16.11	16.17	16.22		203
22															
23															
24	15.63	15.55	15.60	15.66	15.72	15.77	15.82	15.88	15.95	16.00	16.06	16.12	16.17		82
25	15.53	15.46	15.51	15.57	15.63	15.68	15.74	15.78	15.83	15.88	15.94	16.00	16.05		138
26	15.44	——	15.41	15.47	15.53	15.57	15.62	15.68	15.75	15.80	15.86	15.92	15.97		116
27	15.56	——	15.57	15.63	15.70	15.73	15.77	15.84	15.91	15.95	15.99	16.03	16.08		219
28	15.63	——	15.63	15.68	15.73	15.78	15.83	15.87	15.91	15.97	16.03	16.09	16.14		147
29	15.56	——	15.58	15.64	15.70	15.74	15.79	15.85	15.91	15.97	16.03	16.08	16.13		62
Mar. 1															
2	15.60	——	15.60	15.65	15.71	15.76	15.81	15.86	15.91	15.96	16.02	16.08	16.13	16.18	89
3	15.62	——	15.62	15.68	15.75	15.79	15.84	15.89	15.95	16.01	16.08	16.15	16.20	16.25	98
4	15.75	——	15.79	15.82	15.86	15.91	15.97	16.01	16.07	16.12	16.18	16.24	16.29	16.34	189
5	15.88	——	15.87	15.92	15.97	16.01	16.06	16.10	16.15	16.20	16.26	16.32	16.37	16.42	256
6	15.93	——	15.94	15.98	16.02	16.07	16.12	16.17	16.22	16.28	16.34	16.40	16.45	16.51	120
7	15.88	——	15.89	15.93	15.97	16.02	16.08	16.12	16.17	16.23	16.29	16.35	16.40	16.45	48
8															
9	15.81	——	15.80	15.84	15.89	15.93	15.97	16.02	16.07	16.12	16.17	16.23	16.25	16.30	93

Rubber CHEMICAL Markets

NEW YORK, MARCH 10, 1936

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-17	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.47
Diphenylguanidine	lb.	.35 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.11 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.21 @	.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	— @	—
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.06½ @	—
Magnesia, calcined, heavy	ton	60.00 @	65.00

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.37 @	.39
Ultramarine	lb.	.12 @	.14
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
Chromium Oxide, bbl.	lb.	.22 @	.23
Guignet's Green	lb.	.70 @	—
Reds			
Antimony crimson, 15/17	lb.	.48 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b Easton	lb.	.09½ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Cryptone, ZS-20	lb.	.10½ @	.10¾
Cryptone, ZS-86	lb.	.10½ @	.10¾
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith	lb.	.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.05 @	.05¼
ZZ (leaded)	lb.	.04⅞ @	.05¼
Anaconda, lead free	lb.	.05 @	.05¼
Horsehead Lead Free Brand:			
Special—3	lb.	.05 @	.05¼
XX Red—4	lb.	.05 @	.05¼
XX Red—72	lb.	.05 @	.05¼
XX Red—78		.05 @	.05¼
XX Red—103	lb.	.05 @	.05¼
U. S. P.—X, bbls.	lb.	.08 @	.08¼
Kadox, black label—15	lb.	.05 @	.05¼
Blue label—16	lb.	.05 @	.05¼
Red label—17	lb.	.05 @	.05¼
St. Joe, black label	lb.	.05 @	.05¼
green label	lb.	.05 @	.05¼
red label	lb.	.05 @	.05¼
Zinc Oxide—French Process			
Florence White seal—7 bbls.	lb.	— @	.06¾
Green seal—8	lb.	.06 @	.06¼
Red seal—9	lb.	.05½ @	.05¾
Yellows			
Chrome	lb.	.15 @	.16
Ocher, dom. med.	lb.	.02¾ @	—

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	22.00 @	24.00
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	70.00 @	75.00
Calcene	ton	37.50 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.40 @	60.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	8.50 @	10.00
Congaree	ton	9.00 @	—
Dixie	ton		
Dixie, Jr.	ton		
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.08 @	—
Mica	ton	65.00 @	80.00
Pyrax A	ton	— @	—
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.56 @	3.76
Talc, domestic	ton	12.00 @	15.00
Whiting, commercial	ton	17.00 @	18.00
Columbia Filler	ton	9.00 @	14.00
English Cliffstone	ton	33.00 @	43.00
Sussex	ton		
Witco	ton	15.00 @	—
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.10½ @	.11
Zinc Stearate	lb.	.26 @	—

MINERAL RUBBER

Black Diamond	ton.	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	25.00 @	28.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.45 @	2.70
glacial, USP, bbls.	100 lb.	14.00 @	—
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08½ @	.13
Stearic, double pressed	lb.	.09 @	.14
Stearite	lb.	.08 @	—
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	—
Oils			
Corn, refined, bbls.	lb.	.12½ @	—
Cottonseed, crude	gal.	.093 @	.10
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.05 @	—
Niger	lb.	.04¾ @	—
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02 @	.02½
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.40 @	.45
Rosin Oil, cmpd.	gal.	.40 @	—
Rubtack	lb.	.40 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.05 @	—
Witco Softener (f.o.b. wks.)	gal.	.15 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.07 @	.08
coal tar	gal.	.07½ @	.08
hardwood	ton	25.00 @	30.00
pine, 200 lb. gr. wt.	bbl.	6.50 @	—
Rosin, grade K, 280 lb.	bbl.	5.55 @	—
Pigmentar, tank cars	gal.	.19 @	—
in drums	gal.	.25 @	.27
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	bbl.	12.00 @	13.00
Solvents			
Acetone, pure	lb.	.12½ @	.13¼
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.29½ @	—
Benzene, 90%	gal	.15 @	.24
Beta-Trichlorethane	gal.	— @	—
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05½ @	.06
Carbon, tetrachloride	lb.	.05 @	.05¾
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.41 @	.44
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Plastogen	lb.		
Reogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.09½
Turpentine, spirits	gal.	.46½ @	.50½
dest. dist., drums	gal.	.45 @	.48
Waxes			
Beeswax, white	lb.	.40 @	.41
Carnauba, yellow	lb.	.39 @	.40
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10 @	.11
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.02 @	.02½
White crude scale 124/126	lb.	.02 @	.02½
Refined, 125/127	lb.	.03¼ @	.04

ANTI-OXIDANTS

AgeRite, Gel	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	— @	—
Flectol White	lb.	— @	—
Flectol B	lb.	— @	—
Neozone	lb.		
Oxynone	lb.	.66 @	.90
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Aresklene	lb.	— @	—
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Laurex	lb.	.24 @	.30
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)	lb.	— @	—

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.26 @	—
Black	lb.	.08½ @	—
White	lb.	.08 @	.12
Brown	lb.	.08 @	.14
Duphax	lb.	.11 @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½ @	.04
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	3.45 @	—
Commercial (bags)	cwt.	1.95 @	2.80
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	439,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1934	449,322	97,898,519	9.73	23,848	5,770,109	11.23	425,615
1935	453,135	115,299,448	11.36	11,389	3,084,331	12.09	441,746
1934:							
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.92	2,058	620,754	13.46	26,260
Nov.	36,325	10,470,076	12.87	1,230	327,672	11.89	35,095
Dec.	17,590	4,974,374	12.62	866	240,780	12.46	16,724
1935:							
Jan.	39,675	10,852,308	12.21	977	278,229	12.72	38,698
Feb.	47,271	12,291,242	11.61	1,845	480,440	11.62	45,426
March	45,350	11,801,152	11.62	1,868	486,379	11.62	43,482
April	39,735	10,096,487	11.34	1,096	285,903	11.64	38,639
May	29,278	7,171,025	10.98	793	202,402	11.39	28,485
June	31,240	7,523,598	10.75	524	153,595	13.10	30,716
July	46,987	11,666,577	11.08	489	132,173	12.06	46,498
August	40,249	10,419,056	11.56	476	130,464	12.23	39,773
Sept.	34,659	8,637,048	11.12	468	120,438	11.48	34,191
Oct.	35,091	8,742,222	11.12	651	188,518	12.92	34,440
Nov.	25,050	6,137,160	10.94	380	101,793	11.95	24,670
Dec.	38,417	9,930,710	11.54	1,821	523,997	12.85	36,596
1936:							
Jan.	32,255	8,624,060	11.94	732	229,129	13.98	31,523

* Revised.
Note: Total 1935 figures (revised) subject to further revision.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,039
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	702	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1934	402	75,349	1,054	438,209	4,988	943,752	13,070	3,633,253
1935	468	86,835	626	188,384	5,747	1,063,126	13,553	3,782,222
1935:								
Jan.	—	—	81	34,687	448	80,097	848	287,583
Feb.	—	—	62	20,981	222	33,850	573	179,583
March	—	—	57	15,917	488	80,643	1,290	354,654
April	—	—	51	11,452	419	58,429	1,721	415,100
May	31	9,464	62	12,931	332	51,805	1,427	380,844
June	105	19,502	75	23,809	330	50,165	591	152,665
July	51	9,800	49	15,758	388	62,736	1,144	303,518
August	50	9,464	31	8,963	445	82,179	1,234	370,431
Sept.	18	3,245	29	6,090	1,682	407,418	1,048	291,652
Oct.	48	8,112	27	7,641	208	33,262	1,287	342,101
Nov.	70	11,931	39	11,706	269	50,657	1,023	261,668
Dec.	91	15,317	62	18,269	414	71,885	1,395	391,386
1936:								
Jan.	70	13,182	30	8,924	656	133,948	1,667	474,682

(1) Weight given in pounds of dry rubber contained in latex.
Note: Total 1935 figures (revised) subject to further revision.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)
(All Quantities in Long Tons)

	Figures on Monthly Basis: 1929	1930	1931	1932	1933	1934	1935	1936
Jan.	43,002	36,194	28,557	29,648	22,645*	39,190*	47,103	48,506
Feb.	41,594	33,302	28,797	31,821	21,392*	40,515*	43,187	
Mar.	44,730	35,540	32,788	29,505	17,483*	47,003*	42,620	
Apr.	47,521	39,686	33,321	27,518	25,928	44,853*	44,714	
May	49,233	39,386	37,817	30,957	44,074	42,918*	41,568	
June	43,227	34,195	37,916	41,475	50,743*	40,147*	36,623	
July	41,526	29,508	31,397	29,976	49,614*	32,553*	36,384	
Aug.	38,274	30,850	27,586	23,721	44,428*	33,216*	39,242	
Sept.	34,707	25,515	23,638	23,847	35,281*	30,258*	37,553	
Oct.	34,800	27,516	22,277	22,286	31,543*	31,253*	42,436	
Nov.	27,659	23,691	22,943	23,231	28,851*	34,748*	42,778	
Dec.	25,531	21,687	21,409	18,015	28,757*	36,569*	42,942	
Tot.	469,804	375,980	348,986	332,000	400,719*	453,223*	497,150	

* Revised.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,252
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,000	1935	122,948	112,712	22.7	25,069

	Figures on Monthly Basis: Production	Consumption: Tons	Consumption: % to Crude	Stocks*		Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1935:									
Jan.	10,465	11,261	23.9	22,291	July	8,421	8,396	23.1	17,810
Feb.	10,072	9,374	23.3	22,989	Aug.	9,557	8,795	22.4	18,272
Mar.	10,549	9,741	22.9	20,637	Sept.	9,041	8,764	23.4	18,260
Apr.	10,315	10,466	23.4	18,716 a	Oct.	11,926	9,662	22.8	19,640
May	10,223	9,938	23.9	18,541	Nov.	11,482	9,084	21.2	21,478
June	8,590	8,710	23.8	17,932	Dec.	12,307	8,521	19.8	25,069
1936:									
Jan.	11,665	10,039	20.7	26,145	July	.....	.....	...	.....
Feb.	.....	.....	...	.....	Aug.	.....	.....	...	.....
Mar.	.....	.....	...	.....	Sept.	.....	.....	...	.....
April	.....	.....	...	.....	Oct.	.....	.....	...	.....
May	.....	.....	...	.....	Nov.	.....	.....	...	.....
June	.....	.....	...	.....	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.
a Revised.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1934*	1935*	1936		1934*	1935*	1936
January	29,489	28,062		August	39,105	42,836	
February	25,310	26,432		September	34,669	37,862	
March	30,577	31,997		October	37,674	41,401	
April	32,736	36,082		November	34,998	35,956	
May	38,071	39,095		December	30,581	33,734	
June	36,430	37,890					
July	37,466	41,269		Total	407,106	432,556	

* Revised on basis of final annual figures issued by Bureau of Mines.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,252,218
1927	19,700,003	1931	11,253,800	1935	18,664,356

1936:		1936:		1936:	
January	1,877,448	May	.....	September	.....
February	.....	June	.....	October	.....
March	.....	July	.....	November	.....
April	.....	August	.....	December	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1933																																
November	7¼	7⅝	8	8¼	9⅛	8⅛	9⅛	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	9⅛	9⅝	8⅝	9⅛	9⅝	9⅝	9⅝	9⅝	9⅝	9⅝	9⅞	10	10⅛	10	10	—	—	9⅛
December	9¼	9¾	—	9¾	9⅝	8⅛	—	8⅝	8⅝	—	8⅝	8⅝	8⅝	8⅝	8⅝	9⅝	8⅝	8⅝	—	9⅛	9⅛	—	8⅛	9⅛	—	8⅞	8⅝	9	9⅝	—	—	8⅝
1934																																
January	—	9	8⅛	9	9	9	—	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	9⅛	9⅝	8⅝	9⅛	9⅝	9⅝	—	9⅝	9⅝	9⅝	9⅛	10	10	10	10	—	—	9⅛
February	10	9⅞	9⅛	—	10⅛	10⅝	—	10⅝	10⅝	10⅛	—	10⅝	10⅝	10⅝	10⅝	10⅝	10⅝	10⅝	—	10⅝	10⅝	10⅝	10⅝	10⅝	—	10⅝	10⅝	—	—	—	—	10½
March	10⅛	10½	10⅛	—	10⅝	11⅛	—	10⅝	11⅛	11⅛	—	11⅝	11⅝	11⅝	11⅝	11⅝	11⅛	12⅛	12	12⅛	12⅛	11⅞	11⅞	11⅞	12⅛	12⅛	12⅛	12⅛	12	—	—	11
April	11⅛	11⅛	11⅝	—	11⅝	11⅞	—	11⅞	11⅞	11⅝	—	11⅞	11⅞	12	12⅛	12⅛	12⅛	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	—	—	—	12⅜
May	11⅝	11⅝	11⅝	—	11⅝	12⅛	—	12⅛	12⅛	11⅝	—	12⅛	12⅛	12⅝	13⅛	13⅛	13⅛	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	12⅝	12⅝	12⅝	13⅛
June	14⅝	14⅝	14⅝	—	12⅝	12⅝	—	12⅝	13⅛	13⅛	—	13⅛	13⅛	13⅝	13⅝	13⅝	14⅛	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅛	14⅛	14⅛	14⅜
July	13	14	15	—	13	13⅛	—	13⅛	13⅛	13⅛	—	13⅛	13⅛	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝
August	14⅜	14⅜	15	—	14⅜	14⅜	—	14⅜	14⅜	14⅜	—	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜	14⅜
September	14⅛	14⅛	13⅞	—	15⅛	15⅛	—	15⅛	15⅛	15⅛	—	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
October	14⅝	14⅝	13⅞	—	14⅝	14⅝	—	14⅝	14⅝	14⅝	—	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝
November	13⅝	13⅝	13	—	13	13⅛	—	13⅛	13⅛	13⅛	—	13⅛	13⅛	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝
December	13⅝	—	12⅞	13	13	13⅛	—	13⅛	13⅛	12⅞	—	12⅞	12⅞	12⅞	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛
1935																																
January	—	13½	13½	13½	13½	12⅝	13¾	13¾	13⅝	13⅝	13⅝	13⅝	—	13⅞	12⅞	13⅛	13⅛	13⅛	13⅛	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝
February	12¾	12¾	—	12¾	12¾	12	12⅛	12⅛	12	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝
March	12¾	12¾	—	12¾	12⅝	11	11⅛	10⅛	11⅜	11⅛	11⅛	11⅛	12	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛
April	11⅜	11⅝	11¾	11⅝	11	11⅛	11⅛	10⅛	11⅜	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛
May	11⅞	11⅝	11⅞	11½	12⅛	11⅛	11⅛	11⅜	11⅜	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛	11⅛
June	12⅛	12⅛	12⅛	12½	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛
July	12⅛	12¾	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝	12⅝
August	12⅛	12¾	11⅝	11⅝	12¼	12⅛	11⅜	12	12	11⅝	11⅝	12⅛	11⅝	11⅝	12⅛	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	12⅛	12⅛
September	—	12⅛	11⅝	11⅝	11⅝	12⅛	11⅝	11⅝	11⅝	11⅝	11⅝	12⅛	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝
October	11⅜	11⅜	11⅜	11⅜	12	12⅛	11⅝	12	12⅛	12⅛	12⅛	12⅛	12⅛	12⅝	12⅝	12⅝	12⅝	12⅝	13	13	13	13	13	13	13	13	13	13	13	13	13	13
November	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛
December	13⅛	13⅛	12⅝	12⅝	13	13⅛	13⅛	13⅛	13	13	13	13	13	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛	13⅛
1936																																
January	—	13½	13⅜	13⅜	13⅜	13⅜	13⅛	13⅛	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜	13⅜
February	15⅛	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝
March	—	15⅝	15⅝	15¾	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents
Jan.	15.24	8.34	4.38	3.08	9.32	13.10	14.35
Feb.	15.85	7.70	4.03	2.95	10.45	12.92	15.48
Mar.	15.34	7.71	3.35	3.01	11.01	11.51	
Apr.	14.93	6.43	3.02	3.56	12.10	11.55	
May	14.24	6.49	3.09	4.95	13.26	12.05	
June	12.45	6.35	2.66	6.15	13.51	12.57	
July	11.24	6.37	2.89	8.01	14.60	12.10	
Aug.	9.96	5.38	3.63	7.31	15.47	11.98	
Sept.	8.28	5.08	3.84	7.30	15.36	11.55	
Oct.	8.20	4.87	3.65	7.64	13.96	12.62	
Nov.	9.01	4.65	3.44	8.66	13.04	13.15	
Dec.	9.05	4.64	3.24	8.87	12.98	13.28	
Average for Year	11.98	6.17	3.49	5.96	12.92	12.37	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	Dec.	Jan.	Feb.	Mar.	Day	Dec.	Jan.	Feb.	Mar.
1	—	—	6 1/8	—	17	6 3/8	6 7/8	7 7/8	
2	6 1/2	6 7/8	—	7 3/8	18	6 3/8	6 7/8	7 7/8	
3	6 3/8	6 7/8	7	7 3/8	19	6 3/4	—	7 7/8	
4	6 3/4	6 7/8	7	7 3/8	20	6 3/8	6 7/8	7 7/8	
5	6 3/8	—	7	7 7/8	21	6 7/8	—	7 3/4	
6	6 3/8	6 5/8	7 1/8	7 1/2	22	—	6 7/8	7 3/4	
7	6 7/8	6 5/8	7 1/8	7 1/2	23	6 3/8	6 7/8	—	
8	—	6 7/8	7 1/4	—	24	6 3/8	6 7/8	7 3/8	
9	6 3/8	6 7/8	—	7 7/8	25	—	7	7 3/8	
10	6 3/8	6 3/4	7 3/8		26	—	—	7 1/4	
11	6 3/8	6 3/4	7 3/8		27	6 3/8	7	7 3/8	
12	6 3/8	—	7 3/8		28	—	—	7 3/8	
13	6 3/8	6 3/4	7 3/8		29	—	6 7/8	7 3/8	
14	6 3/8	6 3/4	7 3/8		30	6 7/8	6 7/8	—	
15	—	6 7/8	7 3/8		31	6 1/2	6 7/8	—	
16	6 7/8	6 7/8	—						

Average Monthly Price Per Pound

Month	1933 Pence	1934 Pence	1935 Pence	1936 Pence	Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence
Jan.	2.364	4.429	6.434	6.758	Aug.	2.654	3.811	7.401	5.696
Feb.	2.093	4.920	6.292	7.255	Sept.	2.485	3.728	7.409	5.508
Mar.	2.099	5.136	5.745		Oct.	2.425	3.957	6.806	6.130
Apr.	2.323	5.712	5.604		Nov.	2.518	4.096	6.294	6.308
May	2.966	6.207	5.822		Dec.	2.444	4.200	6.295	6.340
June	3.392	6.245	6.027		Average for Year	2.434	3.233	6.159	5.976
July	3.869	7.053	5.801						

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Jan.	Feb.	Mar.	Date	Jan.	Feb.	Mar.	Date	Jan.	Feb.	Mar.
1	—	11.60	—	11	11.95	11.80		22	11.95	—	
2	12.20	—	11.28	12	—	—		23	11.95	—	
3	12.10	11.75	11.23	13	11.95	11.70		24	11.85	11.31	
4	12.10	11.60	11.20	14	11.95	11.80		25	11.95	11.25	
5	—	11.45	11.24	15	11.85	11.70		26	—	11.25	
6	12.15	11.60	11.30	16	11.80	—		27	11.90	11.27	
7	11.80	11.65	11.32	17	11.85	11.65		28	11.80	11.33	
8	11.90	11.65	—	18	11.85	11.55		29	11.85	11.30	
9	11.85	—	11.32	19	—	11.55		30	11.85	—	
10	11.90	11.75		20	11.85	11.50		31	11.60	—	
				21	11.90	11.45					

Average Monthly Price Per Pound

	1933 Cents	1934 Cents	1935 Cents	1936 Cents		1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	6.23	11.25	12.70	11.91	Aug.	7.43	9.55	13.40	11.48
Feb.	6.05	12.28	12.58	11.53	Sept.	6.30	9.64	13.00	10.80
Mar.	6.39	12.30	11.63		Oct.	6.30	9.58	12.48	11.28
Apr.	7.02	11.80	11.73		Nov.	6.22	10.04	12.53	12.01
May	8.64	11.44	12.25		Dec.	6.00	10.17	12.76	11.99
June	9.47	12.20	11.89		Average for Year	6.41	8.63	12.36	11.88
July	10.76	12.84	12.26						

World Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1934	1935	1936	AFLOAT 1934	1935	1936	ON HAND AND AFLOAT 1934	1935	1936
Jan.	368,660	348,931*	276,372	45,768	42,066	43,870	414,428	390,997*	320,242
Feb.	358,681*	339,335*		53,063	42,969		411,744*	382,304	
Mar.	352,897*	338,700		54,722	44,485		407,619*	383,185	
Apr.	351,073*	334,954		56,251	37,651		407,324*	372,605	
May	350,935*	319,281		57,921	44,375		409,250	363,656	
June	358,461*	320,470		46,698	55,581		404,847	376,051	
July	365,072	330,528		45,869	49,018		410,941	379,546	
Aug.	363,711*	329,548		40,278	47,724		403,989*	377,272	
Sept.	360,623*	326,236		38,831	43,413		399,454	369,649	
Oct.	362,571*	317,850		38,247	49,913		400,818*	367,763	
Nov.	362,826*	303,162		38,625	46,588		401,451*	349,750	
Dec.	355,000*	295,438		47,644	39,094		402,644*	334,532	

(Rubber Manufacturers' Association figures raised to 100%)

* Revised.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	London 1934	1935	1936	Liverpool 1934	1935	1936
January	38,570	81,807	84,791	51,702	66,405	77,188
February	38,752	87,605		52,730	67,983	
March	40,501	92,664		53,813	69,218	
April	42,413	94,361		53,695	70,584	
May	42,190	95,722		54,007	71,927	
June	45,674	98,077		54,028	73,131	
July	50,490	99,226		55,414	74,915	
August	48,953	101,574		56,246	75,584	
September	56,103	101,198		56,848	76,263	
October	63,079	94,749		57,818	76,400	
November	67,656	90,542		60,106	76,301	
December	72,285	86,551		62,505	77,589	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

At end of 1935	Penang and Singapore [1]	Malaya [2]	Ceylon [3]	Holland	Para and Manaos
January	59,609	38,862	5,768	1,397	4,924
February	57,586	37,109	4,756	1,534	5,072
March	55,100	35,969	5,188	1,551	4,847
April	48,827	37,896	4,611	1,536	4,626
May	54,740	36,605	4,647	1,499	4,222
June	51,770	38,209	4,271	1,481	4,036
July	49,958	39,140	4,700	1,448	4,441
August	46,482	34,541	4,866	1,455	4,571
September	33,872	33,489	4,403	1,442	4,673
October	37,597	34,271	3,790	1,440	4,346
November	32,597	34,197	4,393	1,550	4,062
December	28,304	34,015	4,794	1,553	4,683

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.

RUBBER STOCKS AFLOAT

End of: 1935	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
January	42,066	35,600	35,334	113,000
February	42,969	28,750	31,281	103,000
March	44,485	30,400	17,115	92,000
April	37,651	31,400	29,949	99,000
May	44,375	30,300	29,325	104,000
June	55,581	27,485	17,934	101,000
July	49,018	29,150	17,832	96,000
August	47,724	32,800	21,476	102,000
September	43,413	31,090	26,497	101,000
October	49,913	29,000	20,087	99,000
November	46,588	26,250	16,162	89,000
December	39,094	22,000	21,906	83,000
End of 1936:				
January	43,870	22,000	19,130	85,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.

P—Preliminary estimate

TOTAL WORLD STOCKS

At end of	1931	1932	1933	1934	1935	1936
January	510,296	638,416	634,797	661,948	698,153	
February	516,123	626,819	626,227	663,308	686,195	
March	532,080	629,894	638,428	666,382	678,809	
April	531,832	630,803	629,159	658,796	677,006	
May	528,855	627,474	626,537	689,239	677,569	
June	533,021	595,712	613,055	672,804	671,525	
July	548,794	589,037	618,258	676,200	679,061	
August	555,931	597,274	617,449	674,702	680,644	
September	561,838	599,986	623,683	694,361	661,509	
October	588,873	609,368	636,597	680,616	655,000	
November	605,684	614,342	642,968	684,408	623,300	
December	628,826	629,898	654,890	705,975	597,149	
Monthly Average	553,513	615,752	630,171	677,395	665,493	

(Figures from the Survey of Current Business)

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1928	1929	1930	1931	1932	1933	1934	1935
Production	77,944	68,726	50,965	48,739	40,085	45,304	47,233	49,362
Shipments	74,296	69,395	53,638	48,151	40,260	44,094	46,687	50,357
Inventory [2]	13,624	11,838	9,003	7,775	7,644	8,888	9,455	8,196

Figures for Recent Months

	PRODUCTION 1933	1934	1935	SHIPMENTS 1933	1934	1935	INVENTORY 1933	1934	1935
Jan.	2,258	3,922	4,626	2,597	3,222	3,663	7,237	9,684	10,398
Feb.	2,339	4,335	4,383	2,292	3,285	3,287	7,377	10,725	11,530
Mar.	2,038	5,180	4,346	2,092	4,223	4,204	7,290	11,651	11,675
Apr.	3,123	4,470	4,512	3,654	4,438	5,144	6,778	11,981	11,003
May	5,189	4,456	4,175	5,180	5,332	4,067	6,760	11,127	11,131
June	6,100	4,342	3,910	6,305	5,228	4,262	6,615	10,219	10,755
July	5,714	3,353	3,532	5,497	4,157	5,447	6,844	9,437	8,850
Aug.	4,994	3,533	3,993	4,707	4,308	4,739	7,070	8,697	7,805
Sept.	3,999	2,936	3,787	3,503	3,183	3,303	7,595	8,419	8,288
Oct.	3,249	3,287	4,051	2,537	3,010	4,095	8,462	8,657	8,291
Nov.	3,039	3,341	3,997	2,197	3,191	3,990	9,247	8,779	8,249
Dec.	3,082	3,778	4,051	3,531	3,109	4,154	8,888	9,455	8,196

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1928	1929	1930	1931	1932	1933	1934	1935
Production	80,180	68,829	52,420	48,333	36,891	42,546	46,228	47,879
Shipments	77,127	70,592	54,938	50,021	37,911	41,391	45,046	48,241
Inventory [2]	16,117	12,807	9,999	7,922	6,749	7,815	9,180	8,231

Figures for Recent Months

	PRODUCTION 1933	1934	1935	SHIPMENTS 1933	1934	1935	INVENTORY 1933	1934	1935
Jan.	2,093	3,530	4,259	2,535	3,199	3,722	6,197	8,403	9,621
Feb.	2,224	4,077	4,171	2,102	3,323	3,362	6,357	8,445	10,466
Mar.	1,883	5,194	4,123	1,902	4,118	4,168	6,369	10,244	10,406
Apr.	2,853	4,735	4,259	3,051	4,342	4,453	6,189	10,585	10,170
May	5,189	4,359	3,892	5,180	4,902	3,451	6,760	10,043	10,615
June	5,448	4,097	3,480	5,778	5,309	4,024	6,097	8,795	10,050
July	5,603	3,531	3,251	5,211	4,323	5,269	6,440	8,053	8,005
Aug.	4,916	3,680	3,894	4,687	4,198	4,556	6,628	7,555	6,939
Sept.	3,827	3,110	4,125	3,472	3,024	3,426	7,008	7,639	7,565
Oct.	3,506	3,219	4,435	2,676	2,689	4,027	7,831	8,151	8,053
Nov.	2,863	3,169	3,942	2,103	2,767	3,747	8,625	8,503	8,161
Dec.	2,631	3,503	4,048	3,410	2,850	4,035	7,815	9,180	8,231

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	Passenger Cars	Trucks	Canada Total	Passenger Cars	Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	4,009,496	3,285,836	723,660	172,995	139,742	33,253	4,182,491
1935 [1]							
Jan.	292,785	229,233	63,552	10,607	8,269	2,338	303,392
Feb.	335,667	275,623	60,044	18,114	13,885	4,229	353,781
March	429,793	361,816	67,977	21,975	18,179	3,796	451,768
April	477,691	401,628	76,063	24,121	20,686	3,435	501,812
May	364,662	307,522	57,140	20,765	17,093	3,672	385,427
June	361,248	296,609	64,639	15,745	12,276	3,469	376,993
July	336,985	276,084	60,901	13,069	9,471	3,598	350,054
Aug.	239,994	182,389	57,605	7,692	5,524	2,168	247,686
Sept.	89,804	57,285	32,519	5,323	3,819	1,504	95,127
Oct.	275,024	214,609	60,415	8,313	7,128	1,185	283,337
Nov.	398,039	338,425	59,614	13,496	12,042	1,454	411,535
Dec.	407,804	344,613	63,191	13,775	11,370	2,405	421,579
1936							
Jan.	367,252	299,936	67,326	13,302	11,261	2,041	380,554

* Revised.

[1] Figures for the complete period of 1935 were revised by the Bureau of the Census, Department of Commerce, on January 24, 1936.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								DUTCH EAST INDIES [2]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [3]	India & Burma [3]	Sarawak [4]	British North Borneo [5]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,657	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,562	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,294	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,812
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,522	176,705	413,817	53,584	13,134	20,850	8,868	28,051	57,479	78,362	135,247	29,949	11,125	5,055	856,245
1934:															
Jan.	55,055	16,128	38,927	6,929	1,531	1,197	805	1,290	6,513	7,975	13,913	1,109	576	127	80,892
Feb.	57,867	15,027	42,840	8,620	775	1,005	805	1,264	6,706	9,211	13,696	1,232	831	105	87,090
March	58,515	19,907	38,608	6,750	1,412	1,360	806	1,363	8,655	10,539	19,084	1,968	846	113	91,504
April	56,748	20,957	35,791	5,157	762	1,447	894	1,311	7,282	9,808	19,250	1,330	440	236	83,708
May	69,403	25,691	43,712	8,870	1,106	1,892	1,397	997	12,104	14,606	26,598	1,243	726	328	113,579
June	53,282	20,981	32,301	5,397	1,425	1,886	644	1,497	4,860	6,192	15,956	1,593	765	377	72,893
July	53,335	22,829	30,506	3,818	710	1,662	1,048	2,399	5,762	7,369	14,415	1,703	353	252	69,997
Aug.	52,641	17,865	34,776	4,948	552	1,714	1,048	1,908	5,340	8,901	11,356	1,610	710	251	73,114
Sept.	61,051	17,889	43,162	6,555	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	222	87,713
Oct.	47,045	10,226	36,819	6,544	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413	840	401	68,535
Nov.	51,140	8,759	42,381	6,756	501	953	941	1,356	7,621	7,123	5,338	2,356	1,017	334	76,676
Dec.	59,575	15,375	44,200	8,481	990	1,237	680	2,043	10,865	12,953	12,354	2,956	1,035	239	98,033
1935															
Jan.	56,720	17,142	39,578	5,202	2,269	1,630	1,222	2,614	3,812	5,371	8,704	2,650	1,196	460	74,719
Feb.	50,593	17,676	32,917	5,556	731	1,887	760	2,288	4,395	7,663	15,194	2,076	636	254	74,154
Mar.	47,407	13,437	33,970	5,181	701	1,901	773	2,076	5,592	7,950	7,973	1,472	740	526	66,855
Apr.	53,360	16,029	37,331	2,976	370	1,895	846	1,661	5,574	6,873	12,683	2,827	963	185	74,957
May	51,353	23,720	27,633	4,223	674	2,323	848	2,752	6,217	7,931	21,058	2,138	832	315	76,920
June	49,751	18,637	31,114	3,525	1,077	2,031	603	2,869	5,698	8,258	14,168	2,021	659	393	72,416
July	48,975	11,257	37,718	4,106	580	1,870	1,164	1,939	5,899	5,664	8,373	2,015	427	407	70,162
Aug.	51,873	10,978	40,895	5,683	724	759	566	2,062	4,661	6,923	8,875	2,451	1,150	442	74,541
Sept.	51,247	10,418	40,829	3,970	681	1,797	421	2,278	4,089	5,862	9,422	2,248	1,017	493	73,107
Oct.	48,258	19,364	28,894	5,932	1,198	2,168	1,040	2,622	3,937	6,698	16,432	2,748	1,240	462	73,371
Nov.	43,147	10,518	32,629	4,288	1,806	1,356	455	2,155	3,724	3,963	8,511	2,392	936	587	62,802
Dec.	37,838	7,529	30,309	4,942	2,323	1,233	171	2,735	3,881	5,206	3,854	4,911	1,329	531	61,425
1936:															
Jan.	39,101	12,582	26,519	4,131		2,385	938	2,141	4,315	6,347	9,270	2,449			

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: THE FIGURES FOR 1933 ARE REVISED AS OF JANUARY 25, 1935 AND REPRESENT FINAL FIGURES

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,883	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,614
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880		9,978	7,593	4,068	11,878	8,140	11,245	
1934:															
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,660	3,078	1,948	4,945	1,795	6,829	658	669	239	1,033	277	1,495	71,759
Sept.	30,345	11,254	4,244	2,607	2,770	7,346	1,486	4,487	743	501	339	980	465	477	68,044
Oct.	27,323	18,897	3,424	2,148	3,043	7,227	1,296	3,681	798	693	447	813	675	254	70,719
Nov.	35,982	15,875	3,176	3,435	1,568	5,580	1,764	4,488	516	379	187	1,382	542	215	75,079
Dec.	17,305	15,816	3,605	5,207	2,849	3,904	1,979	6,460	1,312	—168	139	1,143	615	762	60,928
1935															
Jan.	39,546	20,383	5,573	4,286	2,670	4,400	1,613	3,446	1,099	419	158	1,252	468	1,245	86,558
Feb.	45,999	15,609	4,593	3,513	1,558	5,582	4,356	1,810	848	399	477	838	567	1,836	87,985
Mar.	44,772	12,810	4,017	6,353	2,710	4,421	1,582	4,624	1,459	240	331	891	630	741	85,581
Apr.	40,061	11,574	3,306	5,820	1,063	6,635	1,653	3,387	1,150	520	329	1,049	432	789	78,115
May	29,962	12,498	3,828	6,049	3,929	5,429	935	1,937	671	982	272	853	815	774	68,934
June	31,410	10,253	3,210	4,551	1,435	3,373	1,831	3,087	496	1,065	446	780	745	604	66,286
July	47,694	9,454	3,247	4,929	1,319	4,484	1,298	1,823	520	572	157	800	548	185	77,030
Aug.	41,057	14,120	4,508	4,790	2,814	4,453	916	1,227	655	528	413	820	752	673	77,726
Sept.	35,256	11,223	3,740	5,453	1,604	3,590	1,696	1,593	449	806	282	1,030	793	914	68,429
Oct.	35,770	3,184	5,175	6,074	812	4,727	2,500*	4,876	829	539	671	1,000	597	742	67,496
Nov.	25,756	2,942	4,731	6,258	4,389	4,361	2,000*	4,858	783	449	245	1,206	1,044	1,276	60,298
Dec.	38,072	4,779	5,522	4,823	2,567	6,112	1,500*		1,019	1,074	287	1,359	750	1,466	
1936:															
Jan.		4,573									369				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-32, Z-88, A-510, DPG
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IN this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

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THE MARKET PLACE Section Continued on Next Page

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THE MARKET PLACE Section Continued on Next Page

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

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THE MARKET PLACE Section Continued on Next Page

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

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INDEX TO ADVERTISERS

Acticarbone Corp. 315, 358
Akron Equipment Co. 358
Akron Standard Mold Co. 358
Albert & Son, L. 358
Aluminum Flake Co. 356
American Cyanamid & Chemical Corp. ..... ——
American Zinc Sales Co. 357
Anaconda Zinc Oxide Dept. of I. L. R. Co. 309, 357
Ansbacher Siegle Corp. 316, 356

Barr Rubber Producs Co. 320, 359
Barrett Co., The 314, 357
Barry, Lawrence N., Inc. 358
Binney & Smith Co. ..... Back Cover, 356, 357
Black Rock Mnfg. Co. 358

Cabot, Inc., Godfrey L. 356
Cambridge Instrument Co., Inc. N358
Carter Bell Manufacturing Co., The 318, 357
Columbia Alkali Corp. 356
Continental Machinery Co. 310, 358
Continental Rubber Co. 359

Du Pont de Nemours & Co., E. I. ..... Inside Front Cover, 357

Francis, Chas. E., Co. 358
Fremont Tool & Die Co. 318, 358

Gammeter, W. F., Co. 358
General Atlas Carbon Co. 357

Hall Co., The C. P. 357
Hamlin Machine Co. 358
Heveatex Corporation 308, 356, 359
Housatonic Machine & Tool Co. 358
Huber, J. M., Inc. 356

Illinois Testing Laboratories, Inc. 320, 358
Imperial Oil & Gas Products Co. 314, 356
International Pulp Co. 320, 356

Jacoby, Ernest, & Co. 318, 357, 359

Kratz, George D. 359

McAlpin Hotel 319
McNulty, Joseph A. 358
Moore & Munger 356

National Rubber Machinery Co. ..... ——
National Sherardizing and Machine Co. 358
Naugatuck Chemical Div. U. S. Rubber Prod., Inc., 307, 310, 356, 359
New Jersey Zinc Co. 357
Noble, R. J. 559
Norton, M., & Co. 358

Olin Laboratories, The R. R. 359

Pequanoc Rubber Co. 319, 359

Rand Rubber Co. 318, 359
Randall, Frank E. 316, 358
Rare Metal Products Co. 318, 356
Revertex Corp. of America 314, 359
Rocaguix 319
Royle & Sons, John 310, 358
Rubber Service Laboratories Co., The 356, 357

Schrader's, A., Son 316
Schulman, A., & Co. 320, 359
Scott Co., Henry L. 308, 358
Smith Chemical & Color Co. 318, 357
Southwark Mfg. Co. 357
Stamford Rubber Supply Co. 320, 357
St. Joseph Lead Co. 322, 357

Thiokol Corp. 359
Titanium Pigment Co., Inc. 357

United Carbon Co. ..... Insert Following 310, 356
United Color & Pigment Co. 356
United Shoe Machinery Corp. 358
U. S. Rubber Reclaiming Co. 359

Vanderbilt, R. T., Co. ..... Front Cover, 356
Vultex Chemical Co. 359

Waldron, John, Corporation 358
Whittaker, Clark & Daniels, Inc. 318, 356
Williams, C. K., & Co. 318, 357
Wilson Co., C. T. 359
Wishnick-Tumpeer, Inc. 356
Woburn Degreasing Corp. of N. J. 357

HUGHES PRINTING CO.
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